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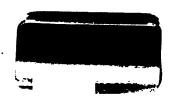
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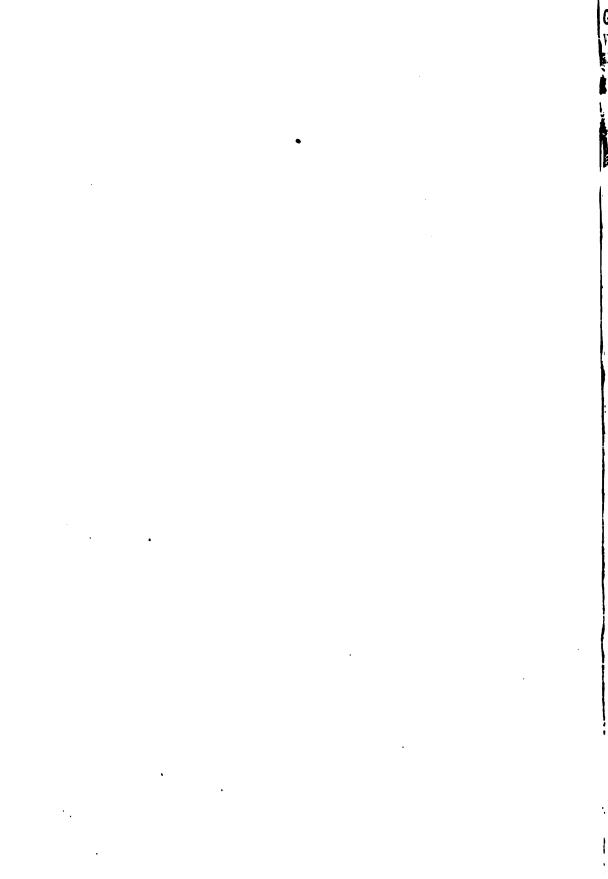
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Gen. Index, Pg. 61
Vol. XIII, No. 12

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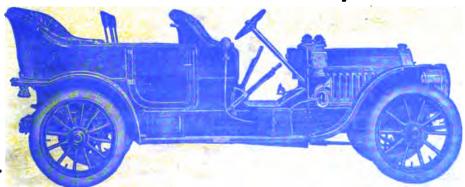


Price, 20c.
JUNE 1, 1909

AUTO MOBILE TRADE JOURNAL



All That the Name Implies

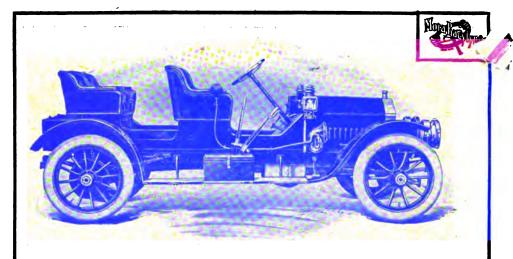


SILENCE—COMFORT

These qualities are distinctive Peerless features

Write To-day for Catalog F

THE PEERLESS MOTOR CAR COMPANY 2459 EAST 93rd STREET, CLEVELAND, OHIO



OPA LIGHT FOUR RACYTYPE

Because of its having individual, detachable, convertible rear seats making a two, three or four passenger car, this type provides—

The Gentleman's Ideal Roadster

for merchants, doctors, sportsmen, and suburbanites.

Because of Mechanically Right construction, correct design and highest grade of material throughout Mora Cars are—

The Greatest Value Offered for 1909

	(RACYTYPE	÷	-	-	-	-	\$2000 ⁻
Four Distinct Types) ROADSTER (4 pas	seng	er)	•	-	2000
With Double Ignition System	TOURER	-	-	-	-	-	2050
	LIMOUSINE	-	-	-	-	-	3250

Detail description sent on request

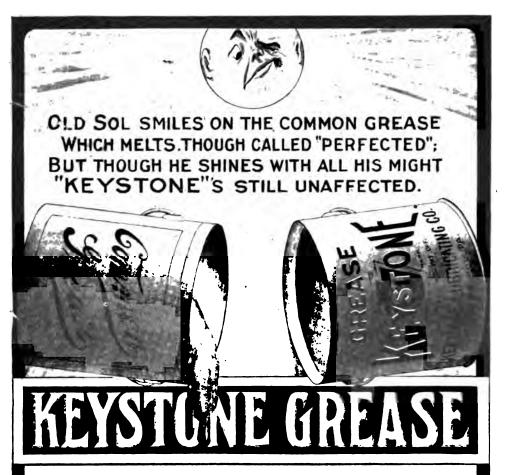
Mora Motor Car Co.

(MEMBERS A. M. C. M. A.)

17 Mora Place, Newark, New York

NEW YORK BRANCH—Broadway and 52d Street CHICAGO AGENTS—1329 Michigan Avenue





"The World's Greatest Lubricant"

is the only satisfactory one for summer use. The hottest temperature does not change its consistency in the least,-it remains just the same as in zero weather. Keystone Grease is therefore the most cleanly and economical lubricant you can use, as it stays where it is needed, instead of melting and running all over the car and streets.

It is not soluble in water. Keystone Grease is a refined, high-grade petroleum oil solely, and will not injure metals, like animal and vegetable oils do. If you want genuine satisfaction you will buy Keystone Grease and no other. We have a special proposition for Jobbers and Dealers.

Keystone Lubricating Co., 20th St. & Allegheny Ave., Phila., Pa.

Chicago Address: Tacoma Bldg. New York Office: (Automobile Department) 1777 Broadway.

Boston Address: Oliver Bldg. New Orleans Address: 610-612 Chartres St.

WE HAVE NO CONNECTION WITH THE OIL TRUST

To The Manufacturer Who Does Not Yet Know "NON-GRAN"

"NON-GRAN" High Speed No. 8 Bearing Bronze does not score the shaft.

Neither does it melt away at the first little lack of oil.

It is always uniform, being made of the purest of prime materials and to a nicety in the process.

RESULT—We Never Lose a Customer.

OTIS ELEVATOR COMPANY

INCORPORATED UNDER THE LAWS OF PENNSYLVANI

S. W. Cor. 12th & Sansom Sts.

PURCHASING DEPARTMENT

6 18 13-07 Form 10

PHILADELPHIA. Dec. 31, 1908.

American Bronze Company,

Berwyn, Pa.

Gentlemen:-

Subject:- BRONZE CASTINGS.

In reply to your recent favor, with regard to the bronze castings, which we have been buying from you, would say, that same have given us very satisfactory results.

We remain,

Yours truly,

OTIS ELEVATOR COMPANY.

HEW/C

Z.J.W.rater

To secure prompt deliveries, we NOW earnestly solicit your contract order for 1910.

Repairmen:

NON-GRAN Cored-Bars

are made for you in 365 different sizes to make your bearing repairs easy, quick and economical Booklet containing table of sizes on request

American Bronze Company, Berwyn, Pa., U. S. A.





BE SURE YOUR WRENCH IS A COES

Every COES package bears the STAR Trademark. Look carefully to see that the wrench the dealer offers you has Coes' name and address on it. It is a protection against cheap, inferior wrenches which soon go to pieces under hard usage. The Genuine Coes will give you a life-time of satisfactory service.



The Lessons you Learn from Books are Good, but the Lesson you Learn from Experience is Better.

The majority of automobilists in the United States have learned by sad experience, that there is only one wrench that will stand the racket,--THE COES. If you are wise, you will profit by their example, and use only the COES for your wrench equipment. There are any number of models to meet all requirements. These are shown in our Wrench-Book,--free for the asking.

COES WRENCH COMPANY

WORCESTER : : : MASSACHUSETTS

J. C. McCarty & Co., 21 Murray Street, New York City

J. H. Graham & Co., 113 Chambers Street, New York City

KEMIZITE"Worry-Proofs" Tires

STOPS ALL PUNCTURES

A PUNCTURE HEALING COMPOUND has been the aim of scores of patents, but it remained for a New Zealander to discover a successful and permanent compound of these unique qualities—harmless, clean, inexpensive and positive, and for the owners of this company to develop and exploit the material.

PNEUMATIC TIRES, while as near perfection as manufacturing limitations permit, are to-day even a relatively greater item in car up-keep than formerly, largely because they are seldom at the proper pressure.

PUNCTURES IN MOST CASES are responsible for blow-outs, although perhaps one in ten comes from other causes, for porous tubes, slow leaks, as well as punctures, are the cause of partially deflated or flat tires.

BY ELIMINATING ALL PUNCTURES, slow leaks and porous tubes, you will prolong the life of your casing, will prevent worry and a large amount of inconvenience.

KEMIZITE, A HARMLESS, clean, creamy liquid, is injected by air pressure in small quantities through the valve stem into the tire and is an absolute necessity; preventing all of the above.

FOR ABOUT ONE-SIXTH the cost of a casing, or practically one-half the price of a tube, you are assured a constant and proper pressure in each tire, preventing the majority of cuts, eliminating about three-fourths of your blow-outs and all punctures.

YOU CAN'T AFFORD to be prejudiced by the undue skepticism of those misinformed or ignorant of KEMIZITE. Investigate for yourself.

IF YOUR GARAGE MAN will not supply you, send to-day and avoid your puncture trouble, for you yourself can easily inject KEMIZITE with your hand pump.

A DEALER IS WANTED in every city and town with automobiles. Just remember that you are not the only live dealer in your locality. Jump at it.

GENUINE MERIT, production equipment the best, modern methods, and a system of distribution second to none, insures universal use of



AUTO TIRE SECURITY CO., DEPT. S

1227 Michigan Ave., CHICAGO

14 Cambria St., BOSTON



does not necessarily condemn an otherwise good device. If the adjustment, once set, is permanent or nearly so, the need for occasional skill may be condoned. Again, if the adjustment can be made while the device is working, the untechnical user can generally learn to manipulate it.

The adjustments of some classes of ignition apparatus are neither permanent nor capable of being set while the apparatus is working. Careful measurements must be resorted to, with a large chance of error. Certain other classes of sparking apparatus need adjusting nearly every time the car runs.

The contact screw is the only adjustable element of the Atwater Kent Spark Generator and the UNISPARKER. It need be touched only about once in 500 miles, and then only to give it a quarter or half turn. The exact setting is not material, provided the contact is long enough to make a spark; and the adjustment may be made, not only while the engine runs, but even in the dark, by the sense of touch alone.

Atwater Kent Manufacturing Works 42 North Sixth Street, Philadelphia, Pa.

When You Buy a Wind Shield You Want

PROTECTION

¶ You don't get it if you can't instantly---without slackening the speed of your carraise or lower it.

The Hydraulic

gives you the protection.



When you overtake a car and there is a cloud of dust ahead of you---raise the shield. When you have passed the car and want fresh and bracing air---lower the shield. All done in the twinkling of an eye and with one finger---the Hydraulic pumps fitted with a spring and filled with oil or glycerine do it.

There is no omparison between the old style shields with the cumbersome and bothersome bolts and nuts and the Hydraulic, which works "as smooth as oil."

Made in Two Widths and Heights \$35.00 \$37.50

including all fittings and either Mahogany or Walnut boards.

¶ All dealers carry them in stock, or will get them for you.

Emil Grossman Company 232 West 58th St., N. Y.

Red 1

HELLO PEOPLE! PEOPLE HELLO!

Here I am!



lect Head

Look at me!

Don't I look like a winner?

Doesn't my smiling face inspire you with confidence that I can do what I undertake?

Although young, I am a better sparker than others many years older than I.

You need not be afraid to leave me out nights, Sundays, holidays or rainy days. I will be on the job whenever or wherever you take me. I never get tired of work, providing you feed me with sufficient electric juice.

Send for booklet, "Sensible Don'ts by the RED HEAD."

Emil Grossman Company, Manufacturer

232 West 58th Street, New York City

"Pirates and Legitimate Manufacturers"

An Open Letter to the Editor

EDITOR CYCLE AND AUTOMOBILE TRADE JOURNAL,

Sir:—It was our pleasure to read in your last issue an editorial titled as above. However it may have been intended by you, it seems to us to bear with peculiar pertinency on certain experiences of our own with the Motor and Accessory Manufacturers' Association.

We are not members of the M. A. M. A. Most of our competitors are. About five years ago, when the Rushmore Lens Mirror Searchlight began to be known as the only genuinely effective automobile gas lamp then existing, we applied for membership in the M. A. M. A., in whose councils certain of our competitors were highly influential. Our application was rejected without explanation, and repeated requests for explanation were ignored.

Subsequently a second application was tabled without acknowledgment or explanation. Membership in the association carried with it, and still carries, the right to preferred locations in the Automobile Shows; and, lacking membership, we had to put up with what we could get in that regard.

During all this time our competitors, large and small, including some of the leading lights of the M. A. M. A., were doing their best to appropriate trade they had not the ability to earn, by pirating Rushmore design in cheap lamp constructions and trading on the reputation of our goods. In these squalid practices a number of the imitators came within reach of the law and were enjoined, and a number outside the association were fined a total of thousands of dollars for contempt of court in disregarding the injunctions.

Despite the devious tactics of competitors who were afraid to fight their battles in the open, the public appreciation of Rushmore quality has been so unmistakable that our business in automobile gas lamps is to-day more than double that of our nearest competitor, and it is increasing as fast as we are able to handle it.

We can afford to be lenient with beaten competitors, but we should like to put the question whether, in view of its past record, the Motor and Accessory Manulacturers' Association is the proper body to be entrusted with the task of repressing commercial piracy.

RUSHMORE DYNAMO WORKS

Plainfield, N. J.

CHICAGO

LONDON

PARIS

EMPIRE TIRES

IN HARRISBURG MOTOR **CLUB CONTEST**

Empires the only make of tires that complete the terrific run without changing a tire

EMPIRE TIRES WEAR LONGEST

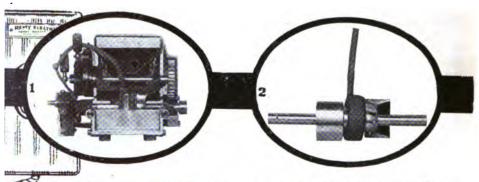
EMPIRE TIRE COMPANY

Factory-TRENTON, N. J., U. S. A.

NEWARK—264 Halsey St. DETROIT—842 Woodward Ave. BOSTON—292 Devonshire St. CHICAGO—20 La Salle St. CHICAGO—1301 Michigan Ave. NEW YORK—73d St. and Broadway. NEW YORK—148 Chambers St.

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PITTSBURG—Consumers' Auto Supply Co. ATLANTA, GA.—Dunham Rubber Co. CLEVELAND, O.—Motor Supply Agency Co. NORFOLK, VA.—Wm. H. Grover. DENVER, COL.—Denver Auto Goods Co. JACKSONVILLE, FLA.—Savell Rubber Co. PHILADELPHIA, PA.—Penn Auto Supply Co. LOS ANGELES, CAL.—Empire Tire & Rubber Co. BUFFALO, N. Y.—Empire Sales Co. MINNEAPOLIS, MINN.—Empire Tire & Rubber Co. SAVANNAH, GA.—Harris Tire Co. NEW ORLEANS, LA.—H. A. Testard. ATLANTIC CITY, N. J.—Penn Auto Supply Co. DALLAS, TEXAS—Munger Auto Co. PORTLAND, ME.—James Bailey Co. PROVIDENCE, R. I.—Waite Auto Supply Co. ST. LOUIS, MO.—Gorman Bros. SYRACUSE, N. Y.—Central City Rubber Co. TOLEDO, OHIO—W. G. Nagel Electric Co. BOISE, IDAHO—Randall Dodd Auto Co.



No. 1—Shows a longitudinal section of the magneto. Above the inductor shaft may be seen the distributor shaft. The distributor shaft is gear-driven and runs at half the speed of the inductor shaft. The wire terminal on the extreme left of the distributor shaft is where the high-tension cable from the transformer coil is attached.

The high voltage is transmitted to the brass

segment on the rubber distributor and as the segment passes the terminals of the wires the current is carried to the spark plugs.

No. 2—Shows the Solid Steel Inductor Shaft, with the drop-forged seel wings or Inductors. The Stationary Winding sits between the Inductors. This winding is made of coarse magnet wire, and it is absolutely water-proof.

REMY HIGH MAGNETOS

are being used on three out of every five American cars equipped with magneto ignition this season

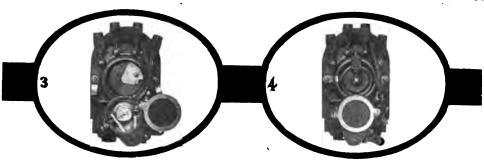
It Is Estimated by Manufacturers That 72,000 Gasoline Cars Are Being Built in America This Year and That 70 Per Cent Are Being Equipped with Magneto Ignition.

We Have Sold Over 30,000 Remy Magnetos on Minimum Specified Delivery for 1909 and Have Bought Material for and Are Building Over 35,000 High-Tension Magnetos for Motor Cars.

First Great Classics of Year Won with Remy Magneto

Feb. 21—Burman sets new World's Record with Remy Magneto. Hurls car around circular track at New Orleans for 100 miles in 102 minutes, lowering world's mark for distance 11 minutes. Mar. 23 - Strang wins 100-mile race at Daytona, with Remy, 64 miles an hour. April 22 - Strang a three time winner with the Remy at Chattanooga hill climb. April 29—Nashville, Tenn., races won by cars equipped with the Remy.

Remy Electric Co., Dept. 13, Anderson, Ind.



No. 3—Shows Type L Remy Magneto for fourcylinder engine with distributor lid removed and cam house lid swung back.

Note the contact points are open. At the instant the points separate, the spark is made. The magneto is shown here at the maximum retard (cam house pulled to extreme right), the spark occurring when the piston rod in the cylinder compression has passed the ton deed center.

spark occurring when the piston rod in the cylinder under compression has passed the top dead center.

Advance the magneto (turn cam house to left) and the spark occurs before the cylinder is at the highest point of compression. When not advanced or retarded, the spark occurs at the exact instant of highest compression.

The Remy allows for a greater advance and retard of the spark, than other magnetos owing to the design of the inagneto, which makes a powerful hot spark, and the current wave being of such long duration that the timing range is a full sixty degrees.

No. 4—Shows Magneto as it looks when equipped to engine. This magneto is the model used on four-cylinder cars. For six-cylinder cars the inductor shaft is geared to run half again as fast as the crank shaft. In the two-cylinder magneto the distributor is not used.

1910 A CONTRACT FOR 1910 30,000 1910 REMY MAGNETOS

Has just been given us by the Buick Motor Company for the Season of

No Higher Testimony of Merit of a Magneto Could Be Given Than the Placing of This—the Largest Contract for Magnetos in the History of the Motor Industry and Magneto Manufacturing — by a Company Which Has Used It as Standard Equipment Throughout the Past Season.

Several New Fire-Proof Factory Buildings Are Now Under Course of Construction and When Completed and Equipped Will Give Us a Capacity of

1,000
High Tension
Magnetos
PER DAY

BRANCH SELLING OFFICES:

New York—Automobile Bldg., 64th & Broadway
Detroit—471 Woodward Ave.
Chicago—1400-1402 Michigan Ave.

Walnut aka Chale Sala Sala Sa Sa Sa Sa Sa Sa

AGENTS AND
GARAGE MEN:
We make fittings
for attaching the Remy
Magnets to many old madels

NO OTHER AUTOMOBILE <u>HAS DONE AS MUCH</u>



10.074 MILES WITHOUT STOPPING ITS ENGINE IS THE RECORD OF THE

A Remarkable Performance

A MAXWELL automobile covered 10,074 miles A MAX WELL automobile covered 10,074 miles over the roads of Massachusetts without stopping its engine. No other automobile has done as much. This is the kind of reliability you get when you buy a MAX WELL. You can pay more—but you cannot buy greater value. There are 14,600 satisfied owners of MAX WELL cars in the United States to-day. This number is growing at the rate of over 1,500 a month. The combined judgment of so many people must be right.

To Those Who Want the Most for Their Money

You expect comfort, appearance and reliability in the automobile you buy—in a word, real service, the 365-day-in-the-year kind.
The MAXWELL offers the most for the money.

The MAA WELL ories the index for the indicey.

The 10,000 mile non-stop run, the greatest thing ever done by an automobile, proves it.

Think of it, more than 10,000 miles of continuous running of the engine, not interrupted by a single adjustment or repair. For distance equal to that from New York to Japan, or approximately one-half way around the world.

Over Two Seasons' Use Without an Engine Stop

This is the record of the MAXWELL. Such a car is safe for you to buy. You have wanted

an automobile, haven't you? You have realized an automobile, haven't you? You have realized what a time saver it would prove—have an automobile that you could absolutely depend on—one that would be always ready, would be a good investment as well as a constant source of pleasure—but you have feared that perhaps it would be expensive to own. Here is an automobile that has proved it can go farther than any automobile ever has—yes, twice as far, without once stopping its engine. This is final and absolute proof of MAXWELL reliability, and equally important MAXWELL economy.

You Cannot Pay Less Than Maxwell Prices and Get Maxwell Values

Why? Because we are building over 12,000 automobiles this season. By ordering raw material in enormous quantities—by the thousands of tons—we buy at the lowest possible figures. That's why MAXWELL automobiles, though moderate in price, are made of as good material as should be the highest priced cars. This 10,000 miles Non-Stop run is something infinitely greater than any automobile has ever done—it marks an epoch in modern transportation. Isn't it worth your while to find out more about the MAXWELL? Let us send you the name of the nearest MAXWELL dealer. At any rate, send for our catalog and copy of official report of this great 10,000 mile Non-Stop run.

MAXWELL-BRISCOE MOTOR CO.

P. O. Box 110, TARRYTOWN, N. Y.

Main Office and Factory

Pawtucket, R. I.

New Castle, Ind.

"Nothing Succeeds Like Success"

We are Moving

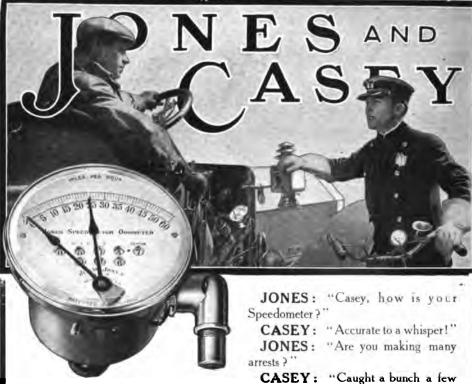
our entire plant and offices to Detroit, Mich, on May I stand will occupy our new factory at Grand River Ave. & Stanton St.

WHY?

¶ Because the Buffalo Carburetor has made good. Increased facilities will enable us to take care of the constantly increasing demand. There is no need for you to experiment. Others have tried the Buffalo Carburetor and the demand for it indicates its superiority.

Buffalo Carburetor Co.

Grand River Ave. & Stanton St., Detroit, Mich.



weeks ago—but nothing doing now. Cars have ALL been equipped with Jones Speedometers. These wise drivers KNOW their speed—and they KNOW I KNOW—See?"

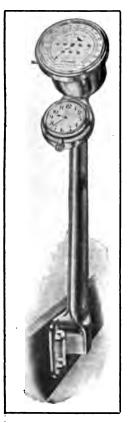
Jones Speedometer

Will keep you out of the clutches of the law. Can you afford to take a chance driving without an ACCURATE, RELIABLE speed-indicator? Can you afford to drive without a JONES? USE the JONES and you need not fear arrest—used for years by the Bicycle and Motorcycle police of the United States and Europe because it is THE STANDARD—THE BEST.

Get a JONES NOW and PUT IT TO WORK!

Jones Speedometer Dept. United Manufacturers, Inc.

Broadway and 76th Street, New York



A Speedometer

for cars of the highest grade

THE STEWART MULTIPOLAR

(Model 14)

Indicating element carried on a diamond bearing, below sapphire guides, indicates from a fraction of a mile to 90 miles

per hour.
This instrument

is built to meet the most exacting requirements. Is handsomely mounted



on a bracket that bolts directly to the frame, giving it distinctive individuality. Write for Particulars.

Stewart & Clark Manufacturing Company

500 Diversey Boulevard, Chicago, U. S. A.

Branches: 1878 Broadway, New York; 697 Woodward Ave., Detroit, Mich.

FEDDERS RADIATORS



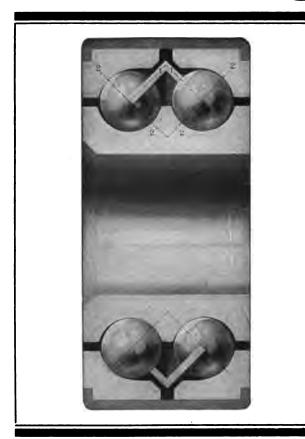
The real square tube radiator—
The New York to Paris Radiator
Will be very much in evidence on the LEADERS.
Look for them. Cut shows one.
You know the make.

FEDDERS MFG. WORKS BUFFALO, N. Y.

NEW DEPARTURE

"TWO-IN-ONE"

Ball Bearing



Some of the Important Advantages:

Two rows of balls give greater load carrying capacity and longer life to the bearing. Each ball makes contact with the ball race at two diametrically different points, insuring correct rolling action.

The lines through the point of contact are at an angle with the plane of the bearing, giving the New Departure distinction as a combined radial and thrust | ball bearing, taking load from any angle.

Write for New Catalog

THE NEW DEPARTURE MFG. CO., BRISTOL, CONN.

More

Speed

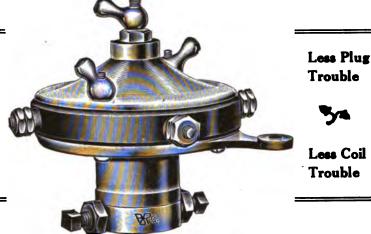
More

Power

The MAXIMUS Makes Motors Mote

Over 12,000 satisfied users. If you are not one of them, you should be; they save your temper, time and money.

PATENTED JUNE 2, 1908



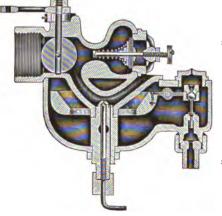
THE "MAXIMUS" TIMER

We know we have the best timer made, and that it will improve the speed, power and smooth-running qualities of your motor; if it does not, your money will be refunded without argument. 85 per cent. of 1908 model machines are equipped with roller type timers. The Maximus is constructed on the principle of the best of these, but has several improved features that overcome the weak points of roller-type timers, and make the motor mote. A special Maximus, designed to be easily applied to 2-cylinder Buick and Models M and N Ford is now ready for delivery.

The unprecedented success of the Maximus Timer encouraged us to experiment in carburetion, and, after careful testing and improving, we are now ready to offer

The MAXIMUS CARBURETOR

Simplified Carburetion

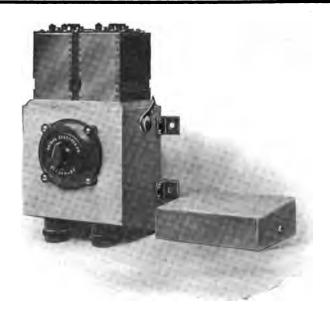


List Price
1-inch Size, \$11.00
1}-inch Size, \$12.00

The principal feature is the improved method of applying both the constant and compensating air. The small opening for the constant air creates a strong vacuum on the nozzle, resulting in throttling to very slow speed and ease in starting. The method of applying the compensating air does away with the sudden increased rush of air on the spray nozzle at change of throttle.

MADE BY

The BECKLEY RALSTON CO., 80-82-84 Michigan Avenue, CHICAGO, ILL.



HEINZE IGNITION APPARATUS



We make a complete line of Coils, Spark Plugs, Timers and Magnetos, low or high tension.

SEND FOR OUR 1909 CATALOGUE



HEINZE ELECTRIC COMPANY

Factory and Main Office: LOWELL, MASS.

A PERFECT TIRE COVER



GORDON Easy-on Tire Cover

It Fits the Tire When New and After Being Used

This cover is cut and shaped to fit perfectly all sides of the tire. The only fastening necessary is at the ends. The two ends of the cover overlap after being put on the tire. On

one end of the cover you will find five brass hooks, the same as on a lace shoe. On the other end will be found a brass ring. After drawing the cover perfectly smooth, place the ring over one of the hooks. The use of the several hooks allows of considerable adjustment. This cover will fit perfectly any and all makes of tires, whether they be round tread, flat tread, Bailey tread, etc., either American or foreign make. Furthermore you are assured of a perfectly snug and smooth fit when the tire is new or after the tire has been worn, or after the tire has been retreaded. Something no other style of cover will do.

We can assure you this is the most satisfactory and economical Tire Cover on the market, guaranteed absolutely water and dust proof.

OUR OFFER

is to send you a sample tire cover "express prepaid" for examination. If it pleases you give us your tire cover business, if it don't please you, send it back at our expense. This costs you nothing, we take the chances, and stand the expense because we know you will like the cover and buy it exclusively. Retail price, \$3.75; liberal discount to the trade. Made in any color, \$3.40.

Send for Catalogue

Tire Covers, Luggage Bag, Tire Bands, Tool Rolls, Spark Plug Holder, Radiator Cover, Inner Patch, Sleeve Protector, Cape Aprons, Inner Tube Cases, Top Hoods, Robes, Lamp Covers, Tire Trunks, Wind Shields, Coats, Gloves, Knuckle Cardan and End Thrust Boots.

THE VEHICLE APRON & HOOD CO. 272 N. 4th Street :: Columbus, Ohio

ALL NEW TOURING CAR

5-Passenger, 50 H. P., 70-mile, 100 in. wheel base, 34 in. tires, 1600 lbs. total weight, \$1,500, with commercial tool plant; \$1,200.00 with good special plant. Same motor units, same drive, for cars as low as \$500.00.

New springs, cannot be closed or broken or toss the car. New chassis frame. New motor. New front axle. New rear axle. New drive. All speeds forward and backward. Fly wheel magneto. Make and break spark. New steering gear. New self-start. Compressed-air control, including steering.

No carburetor. Motor burns any fuel. Not an adjustment on the car save throttle. Motor brake. Air-cooled. Not a key, pin, set-screw or check-nut in car. Silent. Direct drive on all speeds. No sliding gears. No bevel gears. No fan.

All patentable in Europe and America. Drawings now ready to go in shop. Car can be on the road October 1, 1909, and American patents obtained. European patents can be sold for \$5,000,000.00 in 1910.

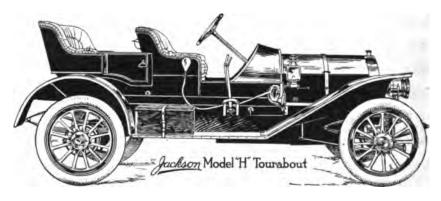
Exclusive assignments of all rights to make, sell and use.

Cash required to apply for first 10 American patents and place first car on the road, \$10,000.00.

Address "Best Car," care of Cycle and Auto. Trade Journal.

JACKSON

Model "H"—\$1600



4 Cylinder, 30 H. P., Bore, $4\frac{1}{2}$, Stroke, $4\frac{1}{2}$

Tires, 32 x 4. Gas Lamp, Magneto. Fur-

nished with Touring or Tourabout Body

MODEL E \$2000. Touring Car or Tourabout. 4 cylinder, 36-40 H. P., unit power plant, valves inclined in cylinder heads, overhead cam-shaft.

MODEL C-\$1259. Touring Car. 2 cylinder, 20-24 H. P., chain drive.

MODEL K-4959. 4-passenger Touring Car. 2 cylinders under the hood, shaft drive, 15-18 H. P.

MODEL F—8356. Runabout. 2 cylinders under the hood, shaft drive, 15-18 H. P.

WRITE FOR CATALOGUE

JACKSON AUTOMOBILE CO. JACKSON, MICH.

AIR COMPRESSORS FOR A WIDE VARIETY OF USES

FOR THE GARAGE



INDISPENSABLE

in the Modern Garage, because of: Saving in labor.

Convenience in use.

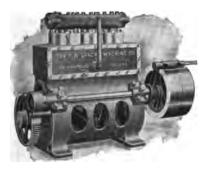


A full line of small belt and motor driven Air Compressors, single and three cylinder styles.

Now is the time to install a complete plant.

FOR POWER PURPOSES

A complete list of medium capacity Air Compressors in all styles for operating:



Pneumatic Drills Pneumatic Hammers

Our complete Compressor outfits prove themselves invaluable when used in connection with Frame and Motor assembling for drilling, riveting and chipping.

All of our designs are new and our construction is such as to withstand hard and continuous service. A circular upon request.

THE F. W. SPACKE MACHINE CO.

INDIANAPOLIS, IND., U. S. A.

Not An Assembled Car

The American Simplex

Fifty Horse-power Valveless, Two-Cycle Motor runs with the smooth rhythm and applies power with the constancy of the Electric Motor



THE day is inevitable when the two-cycle gas engine will be the only type used in motor cars.

- ¶ We have recognized the virtues of the two-cycle principle pioneers among manufacturers of high-grade, high-powered cars.
- ¶ Every manufacturer who puts into his car a six-cylinder engine admits the vital deficiency of the four-cycle principle—intermittent power—and his inability to overcome it.
- ¶ Multiplicity of cylinders merely approaches—never attains—constant turning power—the continuous torque you hear so much about.
- ¶ The American Simplex valveless twocycle engine applies power with the constancy of the electric motor.
- There is not a valve, spring, roller, cam or camshaft on the American Simplex two-cycle engine. They would be superfluous. They hinder the four-cycle from generating its power in a steady,

unceasing rush—yet the four-cycle engine cannot be built without them.

- The American Simplex is manufactured in our own plant in its entirety—motor, transmission, differential, gears, frame—every part where strength or harmonious action is vital to the long life of the car and the smoothness with which its motor runs.
- ¶ That is the reason the American Simplex is a motor car symphony—it has that complete harmonization of parts which no assembled car can have.
- ¶ Our 1908 literature tells of the flexible, three-point motor suspension; flexible radiator attachment; the rear axle transmission; the interlocking device on the gears; the improved torsion tube; the everlasting brake adjustment—every one a feature exclusive in the American Simplex—together with a comprehensive explanation of the differences between the American Simplex valveless, two-cycle motor and all four-cycle motors

Write for it.

SIMPLEX MOTOR CAR COMPANY, Mishawaka, Ind.







HERRESHOFF

THE SMART LIGHT CAR OF CLASS

There is no car at less than double the price that is in the same class as the \$1,500 Herreshoff Car. No other car is planned on the same lines as this smart light car of class. It is built of the same material as the big cars, with as painstaking care, on the same proven principles of good practice, with the intent to build the best that can be built rather than a low-priced car.

In appearance, grace of line and refinement of finish, there is no car at any price superior to it. Its appearance will secure a trial for it anywhere and a demonstration will convince the most skeptical.

The quality of its material speaks in every line. The closer examination made of the car the better will be the impression gained of it. Its peculiarly high efficiency is due to its compactness, its lightness and its correct design.

The Presholl Sar

That C. F. Herreshoff designs and builds the Herreshoff Car is of itself a guarantee of its excellence. Herreshoff stands at the head of American engineers constructing gasolene motors. He has the reputation of getting more out of cylinder sizes than any other engineer in the world.

That Harry S. Houpt introduces the car is a further guarantee of its character. In the conduct of his garage he has taken down in five years nearly every type of motor car in use in America, and has expended more money in racing, experimentally, than most manufacturers. We feel, therefore, especially qualified to judge automobile values.

The car is backed by guarantees from the maker of every part which can be best constructed by specialists, calling for the same quality of material and workmanship employed in the best known American cars.

In motor tests the Herreshoff motor has exceeded the claims made by its designer. It delivers to the rear wheels of the car more than 24 horse power. It is one of the most flexible motors in use in motor cars.

The car itself has withstood every test put upon it. It has developed 54 miles an hour on the road with a low gearing best adaptable to hill climbing. Though no claim of speed is made for it it is confidently asserted that few cars can outstrip it.

Its easy riding and facile handling cannot be described, but must be demonstrated. May we demonstrate it to you?

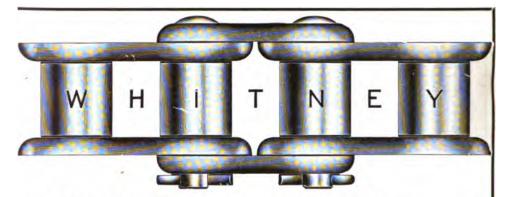
Manufactured by the HERRESHOFF MOTOR CO. of Detroit, exclusively for



New address:--Broadway and 68th Street, New York City TELEPHONE: 6450 COLUMBUS

The Houpt Cars—4 cyl., 60 H. P. and 6 cyl., 90 H. P.—are now being built at our factory at Bristol, Conn., and will be ready for delivery in midsummer.



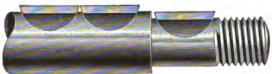


"Whitney" Patent Detachable Chains

are used on the leading commercial and pleasure cars

Note Some of Our Commercial Customers

Adams Vehicle—Alden Sampson—American Motor Truck—Atlas Cleveland—Auto-Car Equipment—Brush Delivery—Cadillac Delivery—Coppock—Dowagiac—Gaeth Delivery—General Vehicle—Grabowsky—Hart-Kraft—Hewitt—Knox—Lansden—Mack Brothers—Manhattan—Oscar Lear—Packard—Pittsburg Motor Vehicle—Plymouth—Rapid—Seitz—Waltham Delivery.



If you are not taking advantage of the Woodruft Patent System of Keying it will pay you to investigate.

Better results and a great saving in cost.

THE WHITNEY MFG. CO. HARTFORD, CONNECTICUT



FOR Comfort Safety Speed Economy



YOU CAN'T BUY

Better Shock Absorbers Than

SUPPLEMENTARY SPIRAL SPRINGS

Because There Aren't Any Better

It is the greatest device in the world for saving your car. Over 15,000 cars are equipped with these springs, and we have letters from users in all parts of the world testifying to their satisfactory qualities.

You run no Risk in Specifying

Supplementary Springs

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Spring
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NEW YORK OFFICE: 1876 Broadway, Room 202



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SOLAR LAMPS HAVE MORE GOOD POINTS

and more exclusive features than all other makes combined.

Examine them critically and you will find—

Exclusive Special Bausch & Lomb Solar Lens Mirror, proven by photometric tests to be the most powerful lens mirror made. More Brass—less solder—riveted parts, fewer parts—simple design—entire construction by tools and jigs—assembling of all headlights by interior screws, which produces a perfectly smooth exterior surface—and the experience of 12 years in the manufacture of the world's Standard Motor Car Lamp!



Badger Brass Mfg. Company

TWO FACTORIES:
KENOSHA, WIS.
437 Eleventh Ave., NEW YORK

High VOLTA SETS THE PACE

It is now the leading magneto of the entire field—the rest follow. The VOLTA has many DISTINCT advantages. For example: simplest No complicated parts. A novice construction.



handles it as easily as an expert. Will not "shoot down" an armature; water-proof and almost wear-proof. BEST imported magnets—those that RE-TAIN—their magnetism. BEST imported annular ball-bearings.

In fact, ALL the virtues of the foreign magnetos with many distinctive virtues of its own. price which SAVES YOU FORTY-FIVE PER CENT duty. Think that over. Guaranteed for one year to be a "Perfect Ignition System in Itself."

Witherbee Everything for Ignition

WITHERBEE IGNITER COMPANY SPRINGFIELD. MASS.

Makers of the famous Witherbee Battery

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DRIVE A WHITE STEAMER and do some real touring



If you drive a White car, you may plan your tours without any thought as to whether the roads are good, bad or indifferent. With a White car, you can drive on a bad road without any more effort than on a good road, and without any inconvenience to your passengers. Simply by handling the throttle, you can adapt the speed of the car, yard by yard, to road conditions.

Most of the interesting parts of the country are without good roads and, therefore, unless you drive a White, your opportunities for real touring are very limited.

Write for catalog describing our Touring Cars at \$2000 and \$4000

THE WHITE COMPANY CLEVELAND, OHIO

New York City, Broadway at 62d St. Boston, 320 Newbury St. Philadelphia, 629-33 N. Broad St. Pittsburg, 133-148 Beatty St.

Cleveland, 407 Rockwell Avo. Atlanta, 120-122 Marietta St. Chicago, 240 Michigan Ave. San Francisco, Market St. at Van Ness Ave.



Recent Victories

CUP WINNER in 300 Miles Endurance Contest, Philadelphia to Wilkes-Barre and Return, January 1-2, 1909

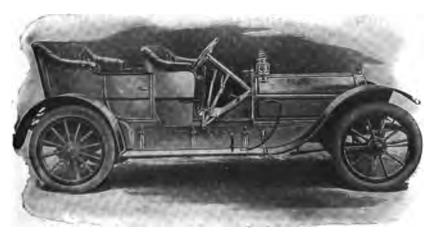
Only THREE out of THIRTY-TWO CONTESTANTS finished this contest, over ice and snow-covered mountain roads, with perfect time scores; THOSE THREE WERE four-cylinder MATHESONS.

TWO MORE PERFECT SCORES won by two Mathesons in New

York-Boston Endurance Contest, 247 miles, March 11, 1909.

Two perfect scores won by two Mathesons in Washington-Hagerstown Endurance Contest, 164 miles, May 15, 1909. First place won by a Matheson in the Norristown-Hagerstown Endurance Contest, 400 miles, May 18-19, 1909.

In the above contests regular stock Matheson cars were entered by private owners after covering MANY THOUSANDS OF MILES of "perfect score" service before entering these contests.



50 H. P.—Six Cylinder Shaft Drive - - \$3,000 Equipped with choice of Touring, Tourabout, Toy-tonneau, Close-coupled or Runabout Bodies.
50 H. P.—Four Cylinder Chain Drive (with touring body) \$5,000 Equipped with Limousine or Landaulet bodies, \$5,750. Roadster or Tourabout bodies, \$4,750

MATHESON AUTOMOBILE COMPANY, Main Sales Office, Garage & Repair Dept. 1886-1888 Broadway, cor. 62d St., N. Y. City

Combina

AUTOMOBILE TRADE JOURNAL

Advertisers in the July number of the Journal, whose contracts are yearly ones, and who are using not less than a quarter page, will have their advertisements inserted without further charge in the July number of the Directory.

This is a somewhat different policy from most publishers, inasmuch as we try to build up a large business by endeavoring to see how much value we can give the advertiser, and therefore our second publication is free upon the terms as above stated.

CHILTON PRINTING COMPANY

LY tion Number

MOTOR CYCLE, MOTOR BOAT & EMUTO MODE BOAT & TRADE DIRECTORY

¶ Don't miss this opportunity of getting this additional publicity without additional cost. The combination of these two publications means the most widespread and largest circulation possible to obtain among automobile owners and the trade. The Journal reaches about 20,000 automobile owners and the balance of the circulation of the Journal and Directory combined takes in practically every manufacturer, dealer, garage, charging station and repair shop in the United States and Canada. It is a great opportunity for getting much for little. Will you take advantage of it?

Market and 49th Sts., Philadelphia

9 SPECIAL AUTOMOBILE POST CARDS IN COLORS

Suitable for Advertising Mailing Cards. One Sample Free for the Asking.

9 Samples Mailed on Receipt of 10 Cents in Stamps

Just the "best ever" for advertising your automobile business.

CHILTONN PRINTING COMPANY Market & Forty-Ninth Streets, Philadelphia



The low price at which we sell the

BRIARCLIFF

is made possible by our systematic manner of manufacturing and the fact that we are putting our cars through in lots of a thousand at a time for the 1910 trade.

SPECIFICATIONS

MOTOR-25-28 H. P. Four vertical cylinders, four cycle. Cylinders cast in pairs. 4½ Bore. 4½ Stroke. Three bearing crank shaft. Water Jacket cast integral. HORSE POWER-A. L. A. M. rating 28-29—actual 34

COOLING—Water.

II. P.

COOLING—Water. Pump gear driven. Radiator of supple size. Fan mounted on ball bearings, and adjustable. CARBURETER—Strombers.

LUBRICATION—In motor base, constant level maintained by gear pump with overflow. Slight feed and oil gauge showing amount of oil in erank case.

IONITION—A single unit coil on dash supplied with dry cells and Splitdor High Tension Magneto.

CLUTCH—Leather faced cone, with cork inserts, provided with large imported ball bearings; no thrust is imparted to the engine or gears by the clutch.

TRANSMISSION—Brown-Lipe selective type, three speeds forward and reverse, mounted on annular Ball Bearings.

speeds forward and reverse, mounted on annular Ball Bearlings.

DRIVE—Shaft drive with two Spicer Universal Joints with triangular Torsion Rods, Drive and Braking strains taken by two Radius Rods.

AXLES—Front axie is of one piece, nickel steel forgings, I beam section. Rear axie is of the semi-floating type, with live axie having 14° driving shaft.

WHEELS—Wood artillery type. Extra large hub flange and 14° spokes. Touring car and "Briarcitif" Models are equipped with 34° and Speedster has 36° wheels. Front wheels are fitted with two-point ball bearings. Rear wheels are mounted on roller bearings.

BRAKES—External and Internal brakes on both rear wheels acting on 14° pressed steel drums.

Write to dealy for such other infe

STEERING GEARS—Worm and sector, Hindley Morse type with 17" Wheel covered with Hard Rubber, molded to

aluminum pider.

FRAME—Pressed steel, channel section 4½ deep, 1½ top rail, with 1 offset in front, and with a 2½ kick-up over the

rail, with 1° offset in front, and with a 2½° klck-up over the rear axie.

GEAR RATIO—Touring car 4 to 1. "Briarcilifi" Model 3½ to 1. Speedster 2½ to 1. Options 3 to 1, 3½ to 1 or 4 to 1. WHEEL BASE—116".

TREAD—56".

TIRES—34"x3½°, and 36"x3½°.

SPRINGS—Front, semi-elliptic 40" long by 2" wide. Rear, three quarter elliptic.

CONTROL—Spark and throttle levers at steering wheel. Two service brake operated by foot pedal on external drum of rear wheels. Two Emergency Brakes operated by hand lever. Speed changes by hand lever in A slot, Throttle accelerator by foot lever.

SPEED—4 to 60 miles an hour on high gear.

GASOLINE CAPACITY—12 to 25 gallons.

GASOLINE CAPACITY-12 to 25 gallons.

OIL CAPACITY-2 to 7 gallons,

UPHOLSTERING—Best quality M. B. Black leather over a high grade curled hair and deep coil springs.

FINISH—All chassis painted light gray or our own distinguishing color, with optional body colors of Brewster Green, Coach Blue, and a medium Red.

EQUIPMENT—One pair 77 Rushmore Search Lights.
One pair square sidelights. One tall light and Generator.
One horn and set of tools, including pump and repair kit
for tires.

Write to-day for such other information as you may desire.

Our TAXICABS are away ahead of anything on the market MERCER AUTOCAR CO., Trenton, N.J.

Every Garage and Repair Shop CAN AFFORD TO INSTALL

MORGAN'S

OXY-ACETYLENE WELDING OUTFIT



The usual price for such an outfit is about \$800, but I have adopted a much more

The usual price for such an outht is about \$6000, but I have adopted a much more simple and reliable plan which enables me to supply it to smaller repair men and manufacturers at a reasonable price, enabling you to save from \$300 to \$500 on the outfit. THE PLANT consists of Oxygen and Acetylene Tanks, Burners with 6 tips, 20 ft. Hose, Wrenches, Goggles, Metal Flux, etc., and will weld anything from 1 in. square to the smallest material. Bigger Sections than 1 in. may be welded by pre-heating the metal in a forge or with a brazing torch.

With this outfit and a little practice, perfect work can be done on steel, wrought iron, cast iron, brass, copper and aluminum.

PRICE OF SMALL OUTFIT, \$150.

Many garages and repair shops have their own acetylene and oxygen tanks. The balance of the outfit will cost only \$2.50 in such cases. The tanks may be recharged

Write for further particulars of this most practical Welding Outfit.

B. MORGAN Newport, R. I.

GIBNEY WIRELESS

THE SOLID TIRE FOR SERVICE



- The Gibney Wireless Motor Tire is making good on every single point of superiority we claim for it.
- If There is none so durable; none so secure; none so resilient as the GIBNEY WIRELESS.

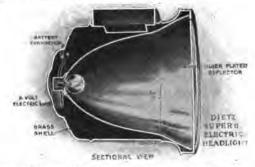
IT WILL PAY YOU TO INVESTIGATE ITS MERITS

JAMES L. GIBNEY & BRO. PHILADELPHIA, U. S. A.



Dietz "Superb" Electric Headlights

¶ Who for a moment doubts but that the Electric Light will ultimately displace all other forms of motor car lighting. You turn a switch on the dashboard—click! presto! your lights are burning! No kerosene; no carbide!



- In the Dietz "Superb" Electric Headlight in outward look is the same as an acetylene headlight and fits the same forks. Inside is placed a silver-plated parabola and a small electric bulb of low voltage, in exact focus, to show the flame on every inch of the silvered surface.
- ¶ RESULT: A light pleasing to the eye and of unexpected candle power.
- ¶ "DIETZ" is a little in advance! Be curious and send for a catalogue which tells you how and where to obtain first class equipment for your cars—electric, acetylene or kernsene.
- If Are you a buyer of lamps in quantity for 1909-1910? Go slow until you are sure we can't interest you!!

R. E. DIETZ COMPANY 60 Laight Street New York, N. Y.

SAGER

Equalizing Springs

FIVE YEARS OF PROVEN SUPERIORITY

When Agents say Sager Equalizing Springs are the Best Shock Absorbers their Opinions are Honest. Ask any of them.

They Prevent Expensive Breakage and make Touring Comfortable, even Luxurious RECOMMENDED BY THESE PROMINENT MANUFACTURERS:

Elmore Mfg.Co. H. H. Franklin Mfg. Co.

Thomas B. Jeffrey Co.

Dorris Motor Car Co.

Crawford Automobile Co.

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Olds Motor Works

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30 Days' Free Trial





Dayton Motor Car Co.

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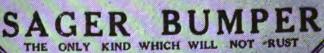
Meteor Automobile Works

Logan Construction Co.

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The Autocar Co.

One Year's Guarantee



Write To-day For Money-Making Proposition

J. H. SAGER CO.

265 South Ave. Rochester, N. Y.



Crucible Steel CASTINGS

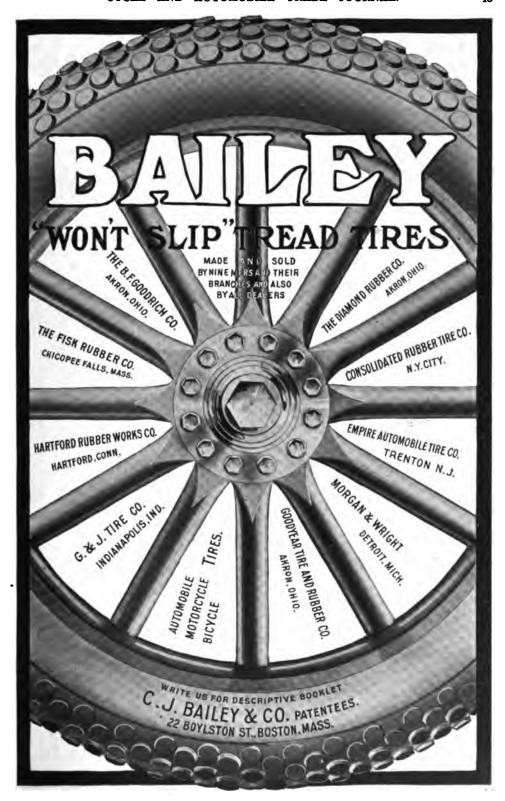
Our castings have great tensile strength and are true to pattern, and owing to their wonderful physical properties may be substituted for forgings in many parts of the automobile. This means a considerable saving in first cost as well as in the after cost of the machining.

Our CRUCIBLE STEEL CASTINGS are made of vanadium and alloys to conform with specifications furnished by customers.

Prompt deliveries can be made by our process. We have a very large plant and most excellent facilities and are prepared to deliver in large or small quantities on schedule time. This ought to interest you if you want to get your product out without delay.

Let us figure on your work for your 1910 requirements. It will pay you to write to us, as we can interest you in the three most important essentials in buying crucible steel castings, viz.:—quality, price and time.

KEYSTONE STEEL CASTINGS CO. CHESTER, PENNA.



OOLITTLE RIMS

DEMOUNTABLE—QUICK DETACHABLE



Would you like to replace a punctured tire with a fresh, fully inflated one with only three minutes of easy work? That is what you can do if your car is equipped with

OOLITTLE RIMS

Any car can be equipped with them in a few hours, using any standard type of tires.

The key and screw bolts, easily and without a moment's delay, expand the rim, forcing it away from the wheel, regardless of rust. spare rim with fully inflated tire is then locked on the wheel.

The damaged tire can be replaced at your convenience, the key and screw bolts contracting the rim away from the shoe, allowing its easy removal and replacement by a new one.

A postal will bring full description and name of nearest agent.

he Doolittle Rim Co. (Ltd.)

1666 Broadway, New York TORONTO, CANADA

COVENTRY, ENGLAND

Notice to Agents -Some good territory still open. Write for particulars.

406 MILES ON ONE GALLON OF GASOLINE



The Brush Runabout \$550

This is the wonderful record of the Brush Runabout in the One Gallon Mileage Test of the New York Automobile Association on May 7th—more proof of our claim for this wonderful little car.

Do you realize that this means a trifle less than three-eighths of a cent a mile for fuel to run a car that will carry two passengers and baggage anywhere an automobile will go?

And this is only one of the features of economy of the Brush. Here are others:

The tire expense is less than on any automobile built in America, due to the facts that the car weighs only 950 pounds and that the tires are larger, proportionate to the weight, than on any other car.

The working parts are so few in number and so durable that the cost of repairs amounts to almost nothing in a season.

These are the points in which you are vitally interested—points which you cannot afford to overlook, if a two-passenger car will meet your requirements.

Brush Runabouts aren't very thick in every locality—can't be, when 2000 of them are distributed over the United States and eleven foreign countries—but we are running our factories 21 hours a day now, and you will soon see the Brush everywhere.

Watch for the little gray car with the black stripes, and watch it deliver the goods every time.

There is still a limited amount of open territory. We want good, reliable dealers for it. Write us.

BRUSH RUNABOUT CO.

512 BALTIMORE AVENUE

DETROIT, MICHIGAN

Established 1906

Members A. M. C. M. A.

-and again!

The Harrisburg Endurance Run, 3rd, 4th, 5th, 6th and 7th of May, was just another conclusive proof of the vast difference in automobile tires—and just one more decisive victory for

GOODRICH TIRES

which equipped the winning Franklin Car and more cars than any other two makes combined—and carried the only car, an Oldsmobile, that made the entire run on one set of tires.

Endurance contests have but one value to YOU—to demonstrate the respective merit and endurance of cars and tires in actual usage. There is money in the pocket of the reader who realizes the net value of a tire reputation based solely on such performances as this.

The Deadly—but Instructive—Parallel

	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Number of Goodrich Tires in the Run	Number of nearest competitors 14 Combined number of other tires, divided among 8 makes 59
Number of Goodrich Tires to finish, 25 (Not one user of Goodrich Tires saw fit to change equipment in order to better his tire condition.) Number of punctures, Goodrich 10	Number of nearest competitors to finish, 6 (A loss of nearly 60% of the original equipment.) Number of punctures, nearest competitor
<u> </u>	sentation). Number of blowouts, other makes 9
Tires on the winner	GOODRICH.
Tires on the One Car that came t	through the Five Days without
tire change—G0	
Goodrich Tires are not called b	

The B. F. Goodrich Co.

AKRON, OHIO

Branches in all Principal Cities

Did You Ever Hear of WESTON, the Great Walker?



We showed them! So severe was the test, so well did the K & W do its part, that Mr. Casscells at once desired the general sales agency of Greater New York.

How can you afford to run your car without a K & W?

K & W's are best; have no equal—so, use no other.

28 x 3 \$5.00 30 x 3 5.25 30 x 3½ \$6.00 30 x 4 7.00 32 x 3½ \$6.50

Other sizes in proportion

If your dealer don't handle it, WRITE US

K & W MFG. CO., Ashland, Ohio

CAR AHEAD!



RIDER-LEWIS "FOUR"

The Biggest Little Car Ever Built

¶ In design, appearance and ability, the Rider-Lewis IV easily heads the list of popular priced cars.

—FEATURES:-

Four Cylinders
Valves in the Head
Magneto Ignition
Thermo-Syphon Cooling
32" x 3½" Tires

Flexible Motor Supports
Rear Axle Gear Set, 3 Speeds
Straight Line Drive
Light Weight
100" Wheel Base

-Simplicity the Very Keynote of the Design-

WE ALSO MANUFACTURE THE EXCELLENT SIX

(The Most Luxurious of Cars), Price. \$2500

CATALOG ON REQUEST. AGENTS GET OUR PROPOSITION

Price, \$1000

The Rider-Lewis Motor Car Co.

Muncio and Anderson, Indiana

THE PERFECTED

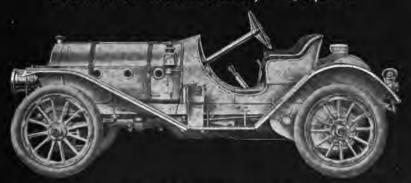
Great Chadwick Six



A Different and a Better Car

Will go faster or slower on the high gear than any large stock car in the world, because of perfect engine control.

Touring Cars, Guy Vaughn and Standard Tourabouts, \$5,500



THE PERFECTED GREAT CHADWICK SIX RUNABOUT
Speed, 90 miles per hour. Weight, 3,000 lbs. Price, \$6,500.

Chadwick Engineering Works POTTSTOWN, PA.

Our new catalog will be ready for mailing within a few days. Send for a copy.

MPORTANT

A new schedule of subscription rates is now in force and all previous schedules will be withdrawn. The price of

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We GUARANTEE that you will get at least 5,000 miles of use from every AJAX TIRE.

Note the recent test of the Maxwell car which broke all non-stop records by 5,000 miles. Only SIX AJAX TIRES were used in the entire 10,074½ miles. One AJAX TIRE ran 7,492 miles before needing even a pump.

Let the "knockers" of the AJAX GUARANTEE and AIAX TIRES continue to "knock." It's good advertising for us and makes the man who knows the motoring economy and satisfaction accompanying the AJAX GUARANTEE root all the harder.

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Responding to yours of recent date, I take pleasure in advising you of the very satisfactory results I obtained with your "AUTO-LOCK."

As you know, my new MAXWELL car was stolen on Dec. 14th last (the same day I bought it), while standing on the curb on Broadway. And yet the car was equipped with a so-called "Circuit Breaker," but the thieves connected the wires and started away. A few days after this, the Police found my car on 8th Ave., damaged—lamps, horn, in fact, all brass parts taken away from it—a loss of some \$150.00.

I then purchased one of your "AUTO-LOCKS" to protect my car, and I highly recommend it as a perfect auto protector and think that every automobile owner should possess one.

Yours very truly,

LEOPOLD FRIEDMAN.

(See ad. in March issue, page 324.)

Patent Applied For



PRICE, \$5.00

How about YOUR car? Why not put a Bongartz "AUTO-LOCK" on your car now? What's the use in waiting until your car is damaged or stolen? Our lock costs only \$5—your car cost ——?

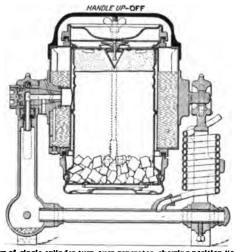
Think it over. Lock your car-for your own benefit.

THE BONGARTZ COMPANY

Thoroughfare Bldg., Broadway and 58th Sts., New York

4





Sectional view of single cylinder turn-over generator, showing position "out of use."

Solves the Lighting Problem for All Time

- \P By the Neverout invertible method, the carbide is instantly separated from the moist residue, positively stopping after-generation.
- I The attention of automobilists, who have been troubled with the old-fashioned gas tanks and faulty generators, is called to the patent system of purification contained in the Neverout bracket. It will be noted that the gas is cleansed and cooled, thereby insuring the life of the burners and giving them an intensely white flame, impossible with other methods.
- I Bracket fastens to running-board—no extras required.
- ¶ The Neverout system of acetylene gas generation is now employed by the U. S. Government on the Panama Canal with great success.
- ${\bf q}$ Made in one, two and three cylinders, holding respectively, two, four and six pounds of carbide.
- I Guaranteed to be satisfactory or money back after ten days' trial.
- I Those who have been worried by the exorbitant charges for re-filling gas tanks, will do well to investigate the Neverout system, which at once makes acetylene safe and dependable, and forever banishes charging stations. It does away with the annoyance of the common generators, as well as the uncertainty and danger of carrying gas under pressure. Investigate to-day.

ROSE MANUFACTURING CO. 911 Arch St., Philadelphia, U. S. A.

Sole manufacturers of the celebrated Neverout Double Focus Searchlights—twice as powerful as the old-fashioned kind

CYCLE AND

Vol. XIII. No. 12

PHILADELPHIA

JUNE 1, 1909

MAY EDITION 24,146.

15.617 Copies mailed at pound rates. Copies delivered to News Com-8,515 pany.

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Sold and expressed in bulk. 200 10 Copies held in reserve.

24.950

Back numbers sent out. 804

24,146 Total copies of May edition.

Of these Were paid subscriptions. 13,885

Delivered to News Company. 8,515 200

Special sales.

22,600

Returned by News Company, to 1.662 May 8th, 1909.

20.938 Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the May issue was 24,-146.

Of these 19,033 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 191/2 ounces, representing 15,617 copies, and 804 copies of back numbers and copies returned by. news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to anyone interested.

COMING EVENTS

American

June 5—Grand Prize Balloon Race, National Championship of the United States, starting from Indianapolis, Ind.

June 1—Start from New York of transcontinental contest for Seattle for Alaska-Yukon-Pacific Exposition.

June 11-12—24-Hour Track Race, Quaker City Motor Club, Philadelphia.

June 12-Dead Horse Hill Climb of Worces-

ter Automobile Club, Worcester, Mass.
June 12-14—New York City, Catskill-Berkshire Endurance Contest, New York Automobile Trade Association.

June 14-18—Endurance Run, Philadelphia to Pittsburg and return, Quaker City Motor Club. June 14-21—Annual Spring Tour of the Maxwell-Briscoe Motor Club. Start from New York; 660 miles; New York, Waterbury, Stockbridge, Newburgh, Delaware Water Gap, Philadelphia, Atlantic City, New York.

June 17—Track Meet of Bay State A. A., Boston, Mass.

June 18-19—Stock Chassis Race for Cobe Trophy and Light Car Race, Chicago.

June 21-26—Binghamton, N. Y., Fourth Annual Endurance Run, Albany, Boston, Hartford, Newburgh, Binghamton Automobile Club.

June 22-28—Fifth Annual Tour, Bretton Woods, Portsmouth, Boston, Albany Automo-bile Club, Albany, N. Y.

June 24-26-Montreal, Blue Bonnets Track, Race Meet, R. M. Jaffray, Manager.

June 25-26-Track Race, Point Quaker City Motor Club.

July 3 and 5-Wildwood (N. J.), 8 away Races, Motor Club of Wildwood. Straight-

July 4—Los Angeles, Cal., Southern California Automobile Dealers' Association. Road Races, 250 Miles for Large Cars; 150 Miles for Light Cars.

July 7—Detroit, Start of Sixth Annual A.
A. Tour for Glidden Trophy.

September 6-11—Lowell Automobile Club Motoring Carnival, Lowell, Mass.

September 15—Flag to Flag Trophy Contest for the Wahlgreen Trophy; starts from Den-ver to the City of Mexico.

ver to the City of Mexico.

October 7—Second Annual Stock Chassis Race in Fairmount Park, Philadelphia, Pa., Quaker City Automobile Club.

November 6-13—National Automobile Show at Atlanta, Ga., in the Auditorium-Armory.

December 29-30—Fourth Annual Mid-Winter Endurance Contest, Quaker City Motor Club.

February 5-12—Ninth Annual Automobile Show at Chicago.

Foreign

May 26-June 1-Annual Automobile Trials of the Irish Automobile Club.

June 1-14—Barcelona Exhibition, under direction of Automobile Club of Spain.

June 6—Light Car Contest, known as the Circuit Provencal, Automobile Club of Marseilles.

10-18-Germany, Prince Henry Cup June Competition.

14-19-Scotland, Scottish Reliability June June 20—France, Boulogne-sur-Mer Course, French Voiturette Race, auspices of "L'Auto."

June 24-July 5-Industrial Vehicle Competition, under direction of Automobile Club of Sweden.

July 1-3—Grand Prix and Voiturette Cup ace, under direction of Automobile Club of Race, France. Race.

July 7-17—Light Agricultural Motor Com-petition at Winnipeg Industrial Exhibition. July 13-17—Belgium, Ogtend Automobile July 13-1 ace Week.

July 17-26—An Exhibition of Agricultural Motors at Amiens, France.
August 22-29—France, Reims, Aeroplane Races and Grand Prix, Aero Club of France.
August 24-27—Circuit of Ardennes; Lieder-kerke Cup and Volturette Race, under directions of Ardennes and Volturette Race, under directions of Ardenn tion of Automobile Club of Belgium.
August 29-September 3—Small Car Competi-

tion, under direction Automobile Club of Ger-

September 5-France, Mont Venteoux Hill Climb.

September 11-19—Italy, Bologne, Florio Cup Race, Automobile Club of Bologne. September 12—Two Automobile Road Races,

under auspices of the Automobile Club of Ostend. 19-Austria. Semmering September

Climb. October 2-17—Aeronautical Salon in the Grand Palais, Paris, France.

GLIDDEN TOUR TO EVOLVE WINNERS

There will be a lot more satisfaction than ever before in the Glidden Tour this year for the small boy, the general wayfarer and the average citizenthose who greet the first arrivals with "whose ahead?" or "who wins?" This is another way of saying that the human interest in the contest will be greater. It is undeniable that everyone expects to see a winner evolved when any sort of a contest is under way. They demand a winner. Explanations do not satisfy. They merely mystify. That if you have a contest there must be a winner, is a natural postulate of every mind, and the club idea and the tied scores of former years were mocking to the average person. In fact, they tended to make the contest seem less serious than it was and it will be a great relief to every one concerned this year to be able to say who is ahead and winning. There will be three individual victories to be scored, one each for the Glidden, Hower and Detroit trophies and the human interest in the tour is three times as great therefore.

Predictions that West would go "Glidden mad" are borne out by the actions of the Minneapolis Club members and in fact the members of all the clubs visited by the Pathfinding party thus far. Nothing seems to be considered too much of an effort—the sky is the limit—and next July when the tour for the first time experiences a Western trip the tourists will all be more than surprised at the enthusiasm met with through the Western towns, villages and cities. In Minneapolis where there is a club of 825 members a large entertainment fund is being raised.

Among the merits of the new rules for the 1909 Glidden tour contest none is being more appreciated by those who compete, and the public that watches, than the one that so divides the cars into classes that each will get a proper value for its performance. It will not be possible, as in other years, for a car of ten horse-power to get credit for performing as well over mountains as one of 60 horse-power. This is something no one expects, and it has been confusing in a harmful way to have all cars running on the same schedule. Another great virtue of the tour this year is that of having a course that will afford both the heavy and light cars a chance of proving prowess. The poor roads will be no worse than in former years, but there will be a greater variety in the road surface and many long grades, both up and down, going to Denver and back.

A guiding car was sent by the Denver Motor Club as far as Jefferson, Iowa, to usher the Glidden pathfinder into Denver, where an enthusiastic reception was accorded the members of the party.

Entries at \$200, each will accordingly be received until June 15, and from then until July 1 at \$300 each.

N. Y. AND N. J. LUBRICANT COMPANY ARE THE ORIGINATORS OF NON-FLUID OIL

We desire to correct a grievous error which appeared in the Motorcycle, Motor Boat and Automobile Trade Directory, of which we are publishers. It is a well known fact in the trade that the New York and New Jersey Lubricant Company, No. 14 Church street, N. Y. City, are the originators of non-fluid oils, and that they have been actively supplying non-fluid cils to the automobile and general power plant trade for at least six years past. writer knows from actual use that these oils under the name of "Non-Fluid Oils" have been supplied to the trade since 1903 by the N. Y. & N. J. Lubricant Company, and that no other oils of a similar character under similar names were placed on the market for about two or three years later. Notwithstanding this fact, under the head of manufacturers of "oils" in the Motorcycle, Motor Boat and Automobile Trade Directory, the N. Y. & N. J. Lubricant Company are stated to be manufacturers of non-liquid oils (an imitation) instead of non-fluid oils. This is a very aggravating error, because of the fact that "Non-Fluid" has always been a trade name used by the N. Y. & N. J. Lubricant Company, and further, because several other concerns who have taken up the manufacture of imitative oils were mentioned as makers of non-fluid oils, thus practically transferring the trademark which had been used so many years by the N. Y. & N. J. Lubricant Company, as a registered trade-mark, to its competit-

We have adopted this method of correcting this mistake, as we feel that great injustice would be done to the N. Y. & N. J. Lubricant Company if any of their prestige should be lost to them by reason of this error.

New York Automobile Carnival

The second annual carnival of the New York Automobile Trade Association, held the week of April 26th, was a decided success. The weather, on the whole, was rather bad, but aside from the delay it necessitated, did little harm. The week's events consisted of a hill climb, speed trials on a level course, a fuel economy contest and a parade, besides a smoker, a special grand opera performance, etc.

The first event of the week was the Fort George hill climb on Dykman street, and despite the cold, bleak wind, which was



Franklin, winner in the New York efficiency contest, May 7, 1909, 36 6-10 miles on one gallon of gasoline. The Franklin car loaded with five passengers starting out from the A. C. A. club house on its record run. Winner of Class C event for cars selling from \$1000 to \$2000, and also the grand prize presented by J. N. Willys for the cars having the highest score in the "Ton Mile" basis.

blowing nearly a gale, fully five thousand persons were on hand to view the contest. The incline is 1,900 feet long and has two rather sharp turns.

The highest honors of the day went to David Bruce Brown, who drove the 120 horse-power Benz racer up the incline in the free-for-all in 28 4-5 seconds.

Mrs. J. N. Cuneo was barred from both the hill climb and the speed trials.

The summary of the first day's events, giving the winning cars, drivers, horsepower, number of cylinders and time, is as follows ·

follows:
Gasoline cars selling for \$850 or less—Maxwell (Mannebach), 10 H. P., 2 cyl., time 2.28;
\$851 to \$1,300, E-M-F (Taylor), 30 H. P., 4 cyl., time .53 2.5; \$1,301 to \$2,000, Buick (Burman), 30 H. P., 4 cyl, time .40 2.5; \$2,001 to \$3,000, Chalmers-Detroit (Knipper), 40 H P., 4 cyl., time .40 4-5; \$3,001 to \$4,000, Palmer & Singer (Lescault), 60 H. P., 6 cyl., time 41 2-5; 4-cylinder, \$4,000 or over, Simplex (Robertson), 90 H. P., time .34 4-5; 6-cylinder, \$4,000 or over; National (Aitken), 60 H. P., time, .24 2-5; free-for-all, Benz (Brown), 120 H. P., 4 cyl., time .28 4-5; electric cars, Babcock (Peck), \$ H. P., time .54 4-5.

JAMAICA SPEED TRIALS.

The chief events of Tuesday, the second day, were the speed trials on Hillside avenue, Jamaica, L. I. The summary of the winners is as follows:

One-mile time trials—Cars under \$1,250, E-M-F (Stark), 30 H. P., time 1.09 4-5; \$1,251 to \$2,000, Buick (Burman), 30 H. P., time .55; \$2,001 to \$3,000, Knox (Bourque), 38 H. P.,

time .56 2-5; \$3,001 to \$4,000; American (Redstar), 50-60 H. P., time 1.00; 4-cylinder, over \$4,000, Stearns (Rutherord), 30-60 H. P., time .53 1-5; 6-cylinder, over \$4,000, National (Merz), 60 H. P., time .48 3-5; free-for-all, Benz (Brown), 120 H. P., time .35 2-5; Stock chassis, over \$3,000, two entries, Knox (Denison), 48 H. P., time .41 3-5; and Bianchi (Hutt), 70 H. P., time .49 4-5.

Two-mile time trials—Cars under \$1.250. E-

70 H. P., time .49 4-5.

Two-mile time trial:—Cars under \$1,250, E-M-F (Stark), 30 H. P., time 2.22 3-5; \$1,251 to \$2,000; Buick (Burman), 30 H. P., time 1.52; \$2,000 to \$3,000; Knox (Bourque), 38 H. P., time 1.56; \$3,001 to \$4,000, American (Redstar), 50-60 H. P., time 2.00 1-5; 4-cylinder, over \$4,000, Stearns (Rutherford), 30-60 H. P., time 1.51 3-5; 6-cylinder, over \$4,000, National (Merz), 60 H. P., time 1.42; free-for-all, Benz (Brown), 120 H. P., time 1.16 2-5; stock chassis, over \$3,000, Knox (Denison), 48 H. P., time 1.34 2-5. time 1.34 2-5.

SPRING OPENING DAY.

Wednesday, April 28th, was the spring opening display day. Thousands of persons visited Automobile Row from Fortysecond to Seventy-sixth street to see the unique and novel designs used by the different firms to decorate their buildings and salesrooms. Inside the salesmen were busy distributing souvenirs to all the visitors, but never missing to inform any prosperous-looking person they could interest, the advantages of their special line. In the evening there was a trade banquet at the Hotel Marseille. General John C. Cutting presided as toastmaster.

The sham battle scheduled for April 29th was abandoned on account of rain.

ONE GALLON MILEAGE TEST.

The one-gallon mileage test, scheduled for Friday, the 30th, was postponed until May 7th, on account of the inclement When it was held there were twenty entrants, and of these a 4-cylinder. air-cooled Franklin, driven by S. G. Averell, made the best record of the day, 36.6 miles This peror 105.408 ton mileage miles. formance won the cup presented by J. W. Willys, of the Overland Automobile Company for the best score, and also captured the cup for Class C, which division comprised cars selling from \$1,251 to \$2,000. Class A, for machines \$850 and under, was won by a Cadillac with 42.6 miles, and a ton mileage score of 99,045. A 16 horsepower Buick won the Class B event, for cars selling from \$851 to \$1,250, with 28.2 miles and 86,574 ton mileage miles. Class D, for cars from \$2,001 to \$3,000 in price, the only competitor, an Overland, made 16 miles and a ton mileage score of 53,500. Class E, for cars from \$3,001 to \$4,000, was won by a Fiat town car, which made 25.9 miles and a ton mileage of 84, 434. A Lozier made 17.1 miles and 89,433 ton mileage miles, winning Class F, for cars over \$4,000 in price. A Thomas won the taxicab event, making 22.7 miles and a ton mileage of 76,839.

THE CARNIVAL PARADE.

The parade was originally set for Saturday, but owing to the still bad weather it was held over to Monday, May 3.

King Guy Vaughan and Queen Annette Kellermann presided and were two of the main attractions. The royal floats led the parade and following them came the historical and racing machines, among which were two contrasting specimens. One was a Haynes runabout of '93, chugging along under its own power, and the other was the representative car of modern automobile production, the Benz 120 horse-power racer. Owing to the high gearing on this car it was necessary that it be towed.

After the antique machines and highpowered cars came the autos entered by dealers and by private owners all elabor-

ately decorated.

The succeeding section consisted of the competitors for the decorated car prizes. The first prize was won by David C. Goodman's six-cylinder Lozier, on which had been built an elaborate representation of "Industry and Fortune."

The second prize was awarded to a float bearing Cleopatra surrounded by her retinue of slaves. A Matheson float bearing a Greek princess won the third award.

The star feature in the grotesque section was "Teddy in Africa," and it was awarded the first prize. The second prize was given to a battleship float bearing a

pickaninny crew.

The first honors in the commercial section were awarded to the Michelin float bearing the noted Bibendum twins. The second prize was awarded to the Thermos float, bearing a huge bottle, on which a queen, driving a number of flying white doves, was seated. A display float, showing a number of cups and trophies won by the Matheson car was awarded the third prize.

AUTOMOBILE GOOD ROADS TESTS

By far the most important step ever taken to ascertain whether the automobile has been unjustly maligned or not as an annihilator of good roads was taken recently at the Executive Committee meeting of the American Automobile Association, held at national headquarters, 437 Fifth avenue, New York City. Co-operating with the United States office of public roads and all of the automobile trade and manufacturing bodies, the A. A. A. has decided to hold early this season, probably in June, a series of severe tests to determine, first, just what damage the automobile does to the road surface, and second, what will be the best measures in road building to adopt so as to prevent the breaking up of the road surface from constant automobile traffic.

In the opinion of the committee the trial should be made as follows: On a straight level course, two miles from the start, four hundred yards should be measured off and an apparatus of the most delicate type arranged for measuring the speed over this 400-yard stretch. At the beginning of these 400 yards four high-speed cameras will be stationed to take right angle pictures. A second station will be placed 100 feet further on and a third station at 200 feet. The cars will go over this 400-yard section at speeds of 5, 10, 15, 20, 25 and 30 miles per hour and in regular increments of five miles increased until the maximum speeds are obtained. On the 6 per cent. grade the cars will go up the grade at maximum speeds and down a grade at approximately the same speed coasting.

In addition to these tests over the regular highways it is also proposed to hold a test over a road especially prepared, the surface being bound by asphalt or other

dustless preparation.

ATLANTA AUTO MEET

An auto meet is to be held on the 15th, 16th and 17th of this month at Fitzgerald, Ga., under the direction of the A. A. A. The program is arranged as follows:

TUESDAY, JUNE 15—Registering of autos,

show, and reception.
WEDNESDAY, JUNE 16—Event No. 1—Five miles; stock cars, \$1000 and under; prize, silver cup. Event No. 2—Five miles; stock car, \$1500

and under; prize, silver cup. Event No. 3—Seven and

one-half miles; stock cars, \$3000 and under; prize, gold medal. Event No. 4—Ten miles; Ben Hill county championship; open local owners, stock cars;

prize, gold medal.

THURSDAY, JUNE 17—Event No. 1—Five miles; free for all; open to Georgia owned

cars; prize, silver cup.

cars; prize, silver cup.

Event No. 2—Five miles; stock cars, \$1000
and under; prize, silver cup.

Event No. 3—Ten miles; stock cars, \$2000
and over; prize, gold medal.

Event No. 4—Seven and one-half miles; open
to cars owned by residents of Georgia; stock
cars; prize, fifty dollars in gold.

Event No. 5—Five miles; open to localists;
stock cars; prize, silver cup.

stock cars; prize, silver cup.
Event No. 6—Twenty miles; free for all.

Prize, gold medal.

The road signs adopted by the A. A. A. are nearly ready and can be ordered from the main office of the A. A. A., at Philadelphia, Pa. The A. A. A. can furnish these signs cheaper than they can be secured elsewhere in small quantities and at the same time maintain a system of uniform-The different signs being prepared are: A double-distance and direction sign. 12 by 16 inches; a single-distance and direction sign, 12 by 20 inches, and four types of danger signs lettered respectively: Run slow, blow horn, sharp turn, steep hill. They will be out soon.

CORRECT PRICES OF ROCKWELL CAB8

In the description of the Rockwell Public Service Vehicles in our May issue, the chassis price was stated as the price of the complete vehicle. The chassis alone sells for \$2350. Retail prices we are informed have never been quoted on complete machines.

Harrisburg Reliability Run

The reliability run of the Motor Club of Harrisburg, Pa., was held May 3-6 inclusive. The run was to Washington the first day, returning the next day to Harrisburg. The third day's run was to Wilkesbarre and the fourth day the cars returned to the starting was finished with no perfect scores. Penalties were imposed for tire trouble, road repairs, road motive help and tardiness in checking.

Class A, for cars selling over \$2,250, was won by a 28 horse-power Franklin, driven



Oldsmobile Touring Car No. 1, driven by Tom Berger, leaving Washington beginning of second day's run of the Harrisburg Automobile Club.

place, climbing over Giant's Despair Mountain en route. The course presented nearly 700 miles of driving over all kinds of roads and in all conditions. The roads encountered the first three days were of the worst kind, and their condition was the main cause of such heavy penalization. Undue

by C. S. Coriss, with a penalty of only 21 points. This car was awarded the Governor's trophy.

A. B. Cocklin, in a Pullman, won the Board of Trade trophy for Class B, for machines listing under \$2,250. Penalty, 56 points.



Pullman Car in the Harrisburg run, driven by A. B. Cocklin, winner of the trophy for cars under \$2250, also second place in the National Capital Trophy.

speeding was eliminated by the establishment of stations all along the line, making it necessary for the cars to check in and out on schedule time.

This, however, was difficult, and the run

Class C was won by P. F. Du Pont's Peerless, for the Capital City cup for runabouts over \$2,000.

J. G. Goodman, in a Pullman, won in the runabout class for cars selling under \$2,000.

TEST REGULATIONS OF ROYAL A. C.

A new test of cars has been instituted by the Royal Automobile Club, of London. The object is to enable manufacturers to obtain official certificates concerning the qualities of automobile engines. The regulations governing tests are, in brief, as

The object of the trial is to submit an engine to a test of comparatively short duration representing the equivalent of a considerably longer period in ordinary use.

The trial will be held under the certified Trials Regulations except as regards Chauses 6, 8, 9, 10 and 12, which shall not apply.

2. These regulations shall apply equally for any engine, irrespective of the number of

cylinders.

3. The certificate shall show the results of the following tests: a. The fuel consumption on the bench. b. The output of the engine as specified by the entrant, maintained for a period of two hours (at the declared number of revolutions), obtained without interruption of the test for which the entrant may at the of the test for which the entrant may at the time of the test decide to continue; together with the period during which he B. H. P. does not fall 7 per cent. below the B. H. P. as specified by the entrant. c. The maximum B. H. P. which can be maintained for fifteen minutes below some limiting speed to be declared by the entrant. d. A record of all repairs and adjustments (except those connected with the carbureter or igniton gear) which may cause stoppage of the engine.

4. The average temperature of the cooling

4. The average temperature of the cooling water supplied during the entire test on the bench must not be less than 50 C. or 22 F.

bench must not be less than 50 C. or 22 F.

5. Every engine so tested on the bench shall be run at least 50 miles in a car (on Brooklands or on a private track). The speed of the car shall be such that when it is on the high gear the engine will be running at two-thirds of the revolutions at which the maker has declared the horse-power. The maximum speed obtained over any distance of not less than two miles shall be recorded.

6. The weight of the engine, the weight and wind area of the car will be recorded.

7. The club shall test the R. A. C. number of the fuel used.

8. No dismantling of any vital part of the

8. No dismantling of any vital part of the engine shall be allowed between the bench and the car test, i. e., no part of the crankcase (including any inspection cover, cylinders, cylinder heads, or valves) shall be removed.

INTERNAL COMBUSTION ENGINEERS MEET

At the regular monthly meeting of the Internal Combustion Engineers' Association, held May 14, in the Sherman House, Chicago, the following officers were elected for the ensuing year: H. R. Linn, President; H. E. King, First Vice-President; W. M. Hampton, Second Vice-President; F. Dimond, Third Vice-President; J. C. Miller, Fourth Vice-President; D. H. Trowbridge, Fifth Vice-President; Charles Kratsch, Secretary; C. C. Sampson, First Assistant Secretary; I. J. Babcock, Treasurer. Directors: C. L. Halliday, C. T. Powell, W. V. Pye, C. Kane, William Hanson, L. G. Poore, F. Dimond, Charles Kratsch, H. E. King.

Mr. P. H. Wood gave the association a short talk on gas producers and at the end answered questions asked by the members present. The next meeting will be held June 11, at which the officers elected at the

last meeting will be installed.

The national automobile show to be held in Atlanta next winter will be opened on November 27 and run until December 4. The exhibition will be in the Auditorium armory. The dates for the show were settled recently at a conference attended by Alfred Reeves, general manager of the American Motor Car Manufacturers' Association; S. A. Miles, general manager of the National Association of Automobile Manufacturers, and officials of the Atlanta Chamber of Commerce and the local automobile club.

New York dealers are planning another orphans' automobile day to be held some time this month, when the inmates of the various orphan asylums will be taken to Coney Island in about 150 automobiles. This will be the fifth annual event of the kind.



Route and checking stations of the trans-continental contest for the M. Robert Guggenheim trophy, now under way from New York to Seattle. The contest is in charge of the Contest Committee of the Seattle Automobile Club. Mr. M. Robert Guggenheim, promotor of the contest and donor of the trophy, is chairman and also referee. There are five prizes, as follows: First, Guggenheim trophy and \$2,000 in cash; second, \$1,500; third, \$1,000; fourth, \$750, and fifth, \$350.

At a meeting of the Contest Board of the Automobile Club of America, held May 18th, a plan was adopted to enforce the rule regulating the speed limit between New York and St. Louis in the ocean-to-ocean contest. A representative of the A. C. A. will act as pacemaker from city to city, and no contestants will be permitted to pass his official flag.

maker from city to city, and no contestants will be permitted to pass his official flag.

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AUTOMOBILE TRADE JOURNAL

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Change of advertising copy must reach this office not later than the 10th of each month. New advertisements will be accepted as late as the 20th.

Philadelphia, June 1st, 1909

THE VALUE OF TRADE PAPERS

It is usually conceded that the upbuilding of the commercial interests of a country is one of the first considerations of both its government and citizens. Upon this upbuilding depends, to a large extent, the strength of the nation. When industry begins to flag and men seek other countries in which to find an outlet for the work of either hands or brains, the country assuredly starts on a downward path. This truth in our own time is well exemplified by Italy, whole districts of which are rapidly falling into decay. Commercial interests and industry have passed away, and consequently the communities have disintegrated.

We wish to point out that one of the leading elements in building, maintaining and cementing into a unit, the commercial interests of a country is the trade paper. Trade papers are to the commercial interests what the daily newspapers are to the general public. By means of trade papers those interested in the various lines of industry are kept informed, placed

in close touch with the work of others and generally enlightened as to the best means and methods extant in their respective lines of endeavor. Such papers are of vastly more benefit and value, from a practical standpoint, than are magazines of short stories and heterogeneous information which in a way simply foster disjointed thinking. The trade paper has a definite and important service to render, and therefore delivers a definite value. Its actual worth to any merchant or manufacturer is often inestimable and its field even reaches, to a large extent, individuals in the community who are indirectly or remotely connected with the commercial interests dealt with.

Occasionally a man is found who claims that he is too busy to read trade publications. Too often these men are the very ones associated with offices and factories. the whole appearance of which indicates that they are not actively in touch with the progress and methods of manufacture of the times, and their factories usually show that they have been run along the same unimproved lines for many years. The desks of such men are usually thick with papers and the papers with dust. They represent the remnants of a past generation who have quietly slept on into the progressive present, but have not yet waked up to the actual conditions surrounding them.

Fortunate it is for our American industries that the proportion of such dreamers is small and that the trade papers are recognized, used and profited by in most business communities. The man of to-day, and the man of the future knows full well the value of the trade paper and uses it accordingly.

THE RURAL INNKEEPER'S GRAFT

At this season of the year the thoughts of the motorist turn with longing toward the country, the woods, fields and rural districts, and each one plans for his or her summer outing or series of week-end excursions in the car. These short trips or tours are usually a source of considerable profit to garage, inn and hotel keepers who are liberally patronized by the motoring fraternity. But on all sides expressions of dissatisfaction and outraged pocketbooks are heard, from the motorists who have been exorbitantly taxed for meagre and often inadequate accommodations supplied by some grasping but short-sighted innkeeper.

The time was when "Motorist" was a synonym for "Millionaire," "Sport" or "Man of unlimited means,"—in other words, legitimate prey for the rural innkeeper's overcharging and graft, but now conditions have entirely changed, at least in so far as the status of the motorist is

concerned. The automobile is now as necessary and almost as commonly employed by the man of moderate means as was previously the family horse and buggy, but in spite of these pertinent facts many of the operators of hostelries on routes largely frequented by automobilists, seem yet to have the idea that every automobile owner must of necessity be a man of large means and therefore his legitimate victim.

The prevalence of the custom of overcharging is largely responsible for the infrequency with which trips of two or more days are now taken by those of comparatively moderate means operating and owning their own cars. These people are often afraid of inadvertently stopping where the bill is likely to be excessive and often burdensome and are just the people who usually, through false pride, dislike to make a disturbance and often pay the over-charges without remonstrance; in fact, the man of considerable means is now much more likely to kick, and although perfectly willing to pay a fair price for services rendered, is the first to register a protest when he feels he is being victimized.

The short tour away from the cares and worries, heat and bustle of the city is one of the most profitable sources of enjoyment to the motor car owner, and although a few are caught unawares by wily landlords and forced to pay exorbitant rates, these are seldom caught a second time and are very apt to warn their motorist friends not to be caught in like fashion. On the whole, this practice of raising the rates on everything from a toothpick to a night's lodging simply because the patron is the owner of an automobile, will eventually do more damage to the landlord who persists in mulcting the unwary tourist than it will to automobilists in general, and we are confident, therefore, the matter will in the natural course of events, right itself. However, in the meantime we warn the rural landlord and innkeeper that this practice is not only distasteful in the extreme to the automobilists, but if persisted in will be found very detrimental to his own best business interests.

THE GREATEST OF ALL ROAD BUILDERS

There is one question closely associated with the automobile which is now and for many years will be, prominently before the legislatures and the people of nearly every State in the Union. We refer to the great question of road building and maintenance. There has been a far-reaching and tremendous awakening among all classes and in all sections of our country to the necessity and the great importance of building suitable highways. The interest which is being shown is evinced by the Second National Good Roads Convention and Congress recently held in the city of Balti-

more, by the conventions which have been held at various other cities and by the plans for further conventions to be held in the near future. It is also shown by the members of many farming communities where the progressive farmers have been stirred to action. Why all of this activity? To what can be attributed this widespread movement, which is destined beyond doubt to emancipate the dwellers in our rural districts from the mud enslaved condition in which they have peacefully wallowed since the time our forefathers outlined our first highways, by cutting into the primeval forests?

The automobile, the much maligned, the destroyer of roads, the dust producer, it is responsible. In fact, it is almost the only factor which has brought about this crusade against the miserable road conditions which have ever existed in our otherwise beautiful country. We say maligned and we believe we use the term advisedly, for the automobile is to-day the greatest of all known road builders. Wherever its appearance has been made, there immediately followed the desire for better roads; individual work was done, meetings held and concerted action, sooner or later, followed. In spite of these well-known and salient facts, the automobile is held up to us as a great road destroyer, and why? Simply because excessive automobile traffic over some of our half built and antiquated so-called roads has resulted in tearing off the top surface and depositing it on the doorsteps, in the houses, and even in the very mouths of the adjacent residents. Instead of meeting the question fairly and squarely with the acknowledgment that the roads were out of date and not fit to cope with present day traffic conditions, those in the few districts most affected have set themselves to legislate out of use the most progressive and civilizing influence which has been felt for many years.

We do not deny that the automobile damages the present inadequate road system; but we feel that this is much more than offset by the tremendous educational influence toward good road building which the automobile has unquestionably exercised throughout the length and breadth of our country. To point to the isolatea and individual roads which have been injured by excessive automobile traffic is in reality begging the main question and is certainly overlooking the most important item in the case, namely, the good roads influence, created and maintained by the widespread and ever-increasing use, of this modern annihilator of distance, the automobile. Even at the present time the government is making tests to ascertain scientifically the effect of automobile traffic on various kinds of road surfaces. These are undoubtedly but the forerunners of many varied and exhaustive tests which will be made in the near future. That a decided detrimental effect will be shown, is not to be disputed, but this is no reason to endeavor to legislate the automobile off the road, that action is not in keeping with the spirit of a progressive nation. The fact must not be overlooked that the inevitable result of these combined tests will be the development of new engineering road-building methods, and roads which will withstand automobile traffic, which also carries with it ability to withstand almost all of the usual forms of traffic and will in time ensure to this nation roads the like of which have never been seen in this country, roads which will make possible communication with outlying districts, roads which will facilitate the marketing of the farmers' products, roads which are up-to-date and capable of serving the purpose for which they are intended.

The Federal Good Roads Department of the government states that the direct sav-

AUTOMOBILE ACCIDENTS FEWER THAN TO HORSE-DRAWN VEHICLES

The advent of the automobile as a means of conveyance has caused it to be given considerable undesired notoriety. The press pays practically no attention to vehicular accidents unless an automobile is involved, in which case great stress is laid on the cause of the accident and its disastrous results. Statistics prove, however, that the number of accidents due to automobiles is much smaller in proportion than of those due to street cars or wagons.

According to E. P. Chalfant, general manager of the Association of Licensed Automobile Manufacturers, the police records show that in New York City from January 1st to April 10th, 1909, there were 434 accidents in vehicles of different kinds. Of these, one hundred and sixty-seven were due to horse-drawn vehicles, one hundred and sixty-two to street cars, ninety to autos, and fifteen to trains, giving a percentage of 38.4 accidents due to horse-drawn conveyances and 37.3 per cent. due to street cars, while of accidents due to automobiles, there were only 20.4 per cent. But in spite of these figures, the automobile, still being somewhat of a novelty, always receives a rather harsh criticism whenever it is the cause of an accident, and it will continue to do so until the newness wears off and it ceases to be attractive news matter, thereby receiving undue publicity.

At the recent annual meeting of the Connecticut Automobile Association, held at New Haven, W. F. Fuller, of the Automobile Club of Hartford, was re-elected president; F. T. Staples, of the Automobile Club of Bridgeport, was made vice-president; W. T. Dill, of the Automobile Club of New Haven, treasurer, and John M. Brooks, of the Litchfield County Automobile Club, was made secretary.

ing to the farmers of this country from properly constructed roads would be \$250,000,000 annually; that there would be a saving of over \$10,000,000 in marketing the wheat crop alone; of over \$12,000,000 in marketing the corn crop, and of \$5,000,000 in marketing the cotton crop.

We have not mentioned the large and increasing revenue, pouring into the road-building coffers, due to the widespread use of the automobile. This is but a small part of what will be required and is not to be considered when compared with the money which will be appropriated when the nation, through the use of the automobile, has been wholly and completely awakened to the necessity for liberal and immediate response for the necessary funds. All road users will undoubtedly unite in this movement, which will eventually result in our nation possessing as good, if not better, highways than any in the world.

TIRE AND RIM COMPETITION

The committee in charge of the Three-Day Catskill-Berkshire Tour, under the auspices of the New York Automobile Trade Association on June 12th, 13th and 14th, has announced a novel tire and demountable rim competition to be held in connection with the tour. All the leading tire and rim makers will be asked to participate. Observers appointed by the tire companies interested will report on the condition of each individual make upon reaching the different controls.

This will be the first time in the history of the tire trade that such an innovation has been introduced in endurance runs in this country.

IMPORTS AND EXPORTS

For the month of March, 1909, there were automobiles and accessories exported valued at \$39,176, which, compared to \$61,439 for the same month last year, shows a decrease of \$21,263. For the nine months ending March, 1909, there was a decrease of \$59,286 worth of autos and parts, as compared to the nine months ending March, 1908. For nine months up to March, 1909, the valuation was \$327,114, while for the same length of time ending March a year ago, the valuation was \$386,390.

Imports of automobiles and parts for the nine months ending March, 1909, amount to \$2,622,824, and show an increase of \$246,901 over the valuation of \$2,375,923 for the nine months ending March, 1908.

Owners of runabouts in New York have started a movement to organize what is to be known as the First Army Motor Corps. The purpose as indefinitely outlined is to form a complete military organization, and have each car fully manned. The men will carry infantry arms and on the different cars will be mounted small machine guns, searchlights, wireless telephone apparatus and surgical outfits.

NORRISTOWN ENDURANCE RUN

On May 18 and 19 a two-day endurance run was made from Norristown, Pa., to Hagerstown, Md., and return under the auspices of the Norristown Automobile Club. The cars were divided into three classes: Class A for manufacturers' cars, Class B other entrants, for the club trophy, and Class C for the member's trophy.

On May 21st the technical committee finished the examination of the cars which participated in the Norristown endurance run. The six-cylinder Oldsmobile, driven by Tom Berger, was declared the winner of the B. E. Block trophy in Class A. having a perfect road score and only a fractional technical point against it.

In Class B, for runabouts, a Studebaker, driven by Frank Yerger, carried off first honors.

In Class C, the club division, there were four winners, namely: -American Traveler, J. E. Mountain, owner, George Parker, driver; Pierce-Arrow, P. V. Hoy, owner and driver; Elmore, Frank Hardart, owner, owner's son, driver; Cadillac, J. E. Lee, owner and driver.

E-M-F STOCK TRANSFERRED

Considerable misunderstanding has been caused by the rumor that the Studebaker had absorbed the E-M-F Company as a result of the deal recently consummated. This rumor is entirely erroneous, as the change made was the succession of Hayden Eames, of Cleveland, and Clement Studebaker, Jr., to the positions on the Board of Directors formerly held by Messrs. B. F. Everitt and W. E. Metzger. The stock transferred, in connection with this change, amounts to only one-third of the capital stock of the E-M-F concern. Walter E. Flanders retains his title of general manager and succeeds to that of president, previously held by B. F. Everitt.

DYKE'S COURSE OF **AUTOMOBILE** INSTRUCTION.

A. L. Dyke, of New Bank of Commerce Bldg., St. Louis, Mo., for years connected with the automobile industry, is now supplying by mail a course of instruction intended for auto owners, chauffeurs and the "uninitiated" generally. This course consists of a 300-page book, with many illustrations, 24 lessons each in pamphlet form and illustrated by charts and two very ingenious working models on heavy card-board. The back of each lesson contains a series of questions covering the subject matter and to be answered by memory. Free pamphlets are being distributed explaining the course of study and large numbers of testimonial letters give proof that the course is proving very satisfactory.

The unique feature of the course is the working models. One of these represents an automobile engine in vertical cross section and has arranged on one face lightweight metal inlet and exhaust valves, cams, connecting rod and crank, which show at a glance exactly what is taking place in the engine. A revolving disc bearing the words induction, compression, explosion and exhaust is seen through a slot as these various actions take place. On the reverse side of the model are brass half-time gears which operate the mechanism. The parts are numbered and explanations are printed on the card. The other model is that of a high tension magneto, showing the armature positions and the gearing on one side and the distributor and timer on the other side, the latter being of metal and provided with a suitable spring and a wire attached to it to give the advance or retard. The subjects of the magneto valve setting and timing the ignition, which are explained, cannot help but be made very much clearer by means of working models. unique these course is all sent at one time for ten dollars (\$10.00) compactly packed in a pasteboard box as shown in the accompanying illustration.

LOOKOUT MOUNTAIN CLIMB

The honors of the climb up Lookout Mountain on April 22, in both free for-alls, went to Buicks. One event was won by Strang in 7 min, 15 3-5 secs., and the other by Chevrolet in 6 min. 30 2-5 secs. Motor cycle honors went to Stubbs in both events. The summaries follow:

The summaries follow:
First Race—Motorcycles, 61 cubic inches and under—Stubbs on Indian, first; Green on Curtis, second. Time, 6.50 2-5.
Second Race—Motorcycles, 32 cubic inches and under—Stubbs on Indian, first.
Third Race—Stock automobiles selling at \$1,000 or under—George DeWitt, Bulck, first. Fourth Race—Stock automobiles, selling at \$2,000 or under—Lewis Strang, Buick, first. Fifth Race—Stock automobiles selling at \$3,000 and under—All entries scratched except Lewis Strang in Buick, and Harry Tuttle in Stoddard-Dayton. Tuttle did not finish. Strang's time, 6.39 4-5.
Seventh Race—Free-for-all stock cars—Lewis Strang, Buick, first: Charles Duffy, Thomas, second. Time, 7.15 3-5.

Lewis Strang, Buick, first; Charles Duffy, Thomas, second. Time, 7.15 3-5.

Eighth Race—Free-for-all—Louis Chevrolet, Buick, first; time, 6.30 2-5. Lewis Strang. Buick, first; Buick, second; time, 6.39 4-5.

Empire tire float in the New York Carnival parade, held May 3. The two Pullman cars which each won an event in the Harrisburg Reliability Run, May 3 to 6, were equipped with Empire Tires.



Weed Chain Tire Grips

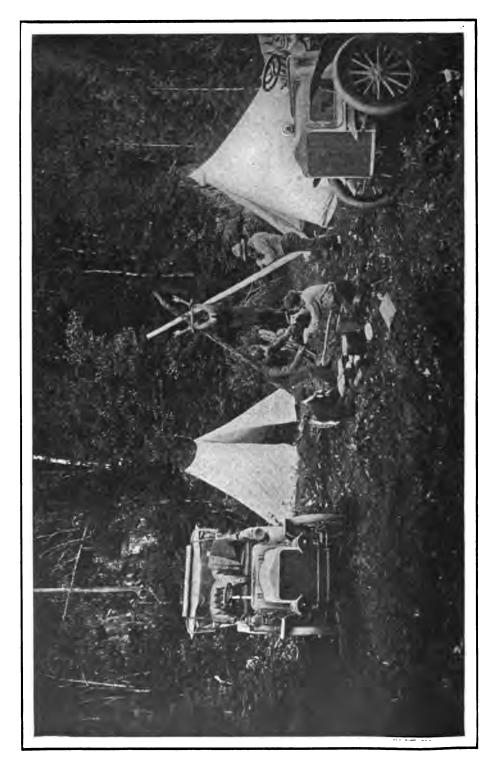
Weed Chains are a necessity. They are part equipment of practically every automobile. They make motoring enjoyable. They minimize danger and guard you against accident because—they positively prevent skidding or slipping. The heaviest automobile climbs hills and negotiates muddy roads easily, if equipped with WEEDS.



The new Weed Cross Chains are specially hardened and BRASS PLATED. There are many spurious imitations of Weed Grips. Unless you get the BRASS PLATED Cross Chains you are not getting the genuine.

Weed Chain Tire Grip Dept.
United Manufacturers, Inc.

Broadway and 76th St., :: NEW YORK



rontisple

A Twentieth Century Camping Trip

BY CHARLES B. HAYWARD.

Hal and myself were campers of old. So many seasons of vacations in the woods had we to our credit, that we were well above the how-to-camp-out stamp of literature and the compendiums of advice on the don'ts and be-sure-to-take-alongs that every would-be communer with nature at her best feels called upon to fly to, the moment it is decided to abandon the rut of the summer hotel vacation for something less formal. We had long since outgrown our novitiate, and not only knew just what to take along, but also, of far more importance, what to leave behind. To tell the

to tote along such a load of excess baggage. Our tents, cots, cook stove and the rest of the well tried-out paraphernalia only had a limited factor of portability. Once considered the acme of compactness—a veritable multum in parvo of its weight, it was manifestly a stumbling block to an automobile camping trip. Hal's machine was a Locomobile touring car, but tents alone would have monopolized the tonneau and given the car the semblance of a laundry wagon.

"Let's eat at hotels" was unanimously voted down, its sponsor being quite as em-



"We turned up the first side road that looked promising and a stretch of woods raised hopes that were soon fulfilled by finding a small stream."

truth, we had for so many summers seen ourselves and our kit dumped on the shores of some lake or mountain stream, there to loaf away the ensuing fortnight, that, while we were not ready to revert to the piazza round of clothes, dances and flirtations, we pined for something new.

We were keen for an outing, but just what form and how to achieve it was the question; at least until Hal suggested "What's the matter with roughing it in the car? That settled it, and at one fell swoop placed us back in the novice class of campers, for our inventory of necessities that had seen so many summers' services required the aid of a farm wagon to transport from the station to our selected destination. Even had we been willing to transform the car into a truck, we had no desire

phatic as the rest of us in discarding such an unholy suggestion. And then, we needed the tonneau, for, the admission must go on record, we're married, and the skirted halves of both our establishments had always been quite as keen campers. as could be wished. What more entertaining and enjoyable than to be able to cast the burden of culinary cares on the shoulders of mere man for at least two weeks out of the fifty-two? There was no getting round it, we simply had to have the tonneau, and no one relished the idea of the grand wash-up and clean clothes transformation involved in putting up at hotels. With the proviso—on the fair ones' part, of course, that mine host's hospitality was only to be resorted to, weather compelling. that alternative was definitely abandoned.

We gave ourselves over to the full delights of a typical attack of camping fever, devoured every scrap of literature on the subject and as feverishly sought for more. Unfortunately, there was not a great deal to be found that we were not already familiar with. Automobile camping had not yet become the pet victim of the advice writer. Somehow or other, no one seemed to have taken an auto camping trip under exactly the conditions that we were planning for ourselves. We followed up every possible trace, besieged our friends and eagerly grasped at every clue, but every camping trip that had been carried out

should practice actually come anywhere near the successful carrying out of our beautiful theories and calculations.

But like the strained efforts of most would-be campers in this direction, all our preliminary schemes and calculations were vain. They were swept away by the happy discovery that there was such a thing to be had as special equipment for an auto camping trip. Then we made another discovery, and our delight at learning the existence of auto camping outfits was not wholly untinged with regret. Like the manufacturer who works his old fashioned equipment long after it has become



"Things were gotten at with a will and in less than an hour, tents were up, * * and eating preparations were well under way."

à la automobile, so far as we could learn, had been along different lines. Some had as their chief claim to the title, the conversion of the car into a bunk wagon, others had been real professional camping trips in the depths of the woods with two or three cars, one of which served as a baggage train, and still others—but why go on, none of them had any skirts along, while most seem to have had the get-somewhere idea uppermost. They were simply travels without the usual conveniences and comforts.

Though disappointed in not finding precedents, we were not deterred in the slightest, but made plans to suit the occasion. Figured weights, cubic contents and the combined carrying capacities of running boards and trunk rack to a point far beyond what the reality would permit, meanwhile having inward misgivings as to the effect on the puncture and blow-out crop,

antiquated, we hated to part with our timetried outfit. A prairie schooner camping trip might have been possible with it, but as automobiles were not built that way, we reluctantly relegated the greater part of it to the scrap heap, and invested. After we got through figuring, making lists and buying things, the net result was about as follows:

Two small tents of special light weight material.

*Four sleeping bags.

Two pneumatic beds.

Four pneumatic pillows.

Three aluminum pots of assorted sizes and of good capacity.

Two aluminum frying pans.

One folding aluminum oven.

*Fishing tackle.

Two hunters' axes.

*One compass.
Three folding basins.

Two folding buckets.

Coll of 100 feet of quarter-inch manila rope.

*Knives, forks, spoons, etc.

Four auto folding chairs with backs. One folding table.

Canvas bags for provisions.

Special bags for holding outfit (water-proof).

Straps for fastening bags to running boards.

Items marked thus (*) were from our old outfit.

Before making up the grub list, we footed up weights, and to our amazement found we had come slightly under the hundred pound mark. As we would be within striking distance of supplies, particularly during the first part of the trip, the matter of the provender to be laid in before the start was not a serious one. The question of where to go was settled out of hand. The Adirondacks had always been beyond us in former years but now we could realize that ambition. Just where no longer bothered us, for we were going to cruise quite as much as camp.

A bright, warm morning in July saw us

details, particularly over such a well-beaten track? Noon found us a good fifty miles from home, for we respected speed laws, meanwhile keeping an eye out for innocuous looking stretches that might harbor'a lurking "cornstubble," as well as the temptation to "let her out some." The heavy hand of the law, as represented by the uniform one-sidedness of cross roads justice, did not intervene to mar our pleasure or reduce our grub fund. When growing hunger took the keen edge off the pleasure of driving, we halted for a consultation, regarded the carefully packed cooking kit on the running boards and decided to postpone its baptism. Finally, we compromised on a roadside lunch and drove on until we found a village store whose stock provided the wherewithal after the customary exchange of values had been effected. Then on to the first likely spot we came to.

Approaching twilight found us close to ninety miles on our way and then came the all important selection of our first night's stop. Farm houses and hamlets were of far too frequent occurrence to insure that measure of privacy that is the camper's



"Canned soup, huge slabs of bread, broiled steak, that hadn't caught fire more times that it could be put out, washed down with a liberal supply of what passed current as coffee, completed the more substantial portions of the first evening's attempt at inward relief."

all packed and ready, the car tuned up to the last notch of touring pitch, every spare we could think of in the tool kit, and a trunk full of old clothes on the rack. The camping outfit was snugly stowed in its bags and lashed to the running boards with any overflow on top of the trunk in the rear. With a parting roar from the open exhaust, we were off, bound up the Hudson to wherever evening should happen to find us. But why indulge in touring

chief delight, so we kept on through Hudson vainly looking for an appropriate site, until Bessie—that's Hal's far better half—suggested that our only hope was in one of the numerous side roads. We turned up the first one that looked promising and a stretch of woods raised hopes that were soon fulfilled by finding a small stream. By a little skillful manoeuvering, the car was piloted off the road and into the woods on what had evidently once been a logging

way. Things were gotten at with a will and in less that an hour, tents were up, beds down, the fair part of the crew assuming that part of the responsibility, and eating preparations were well under way. Canned soup, hot out of its original containers, huge slabs of bread, broiled steak that hadn't caught fire more times than it could be put out, washed down with a liberal supply of what passed current as

"Yer kin put up at the house for the night, if yer don't if yer don't want to get on further," put an end to the awkward silence and brought us to our senses. There stood a hospitable up-State farmer trying to help us out of what looked like an uncomfortable situation to him. And there was the house, hardly three hundred yards away and plainly visible through the trees. Up to then, we hadn't even



In places the roads were very rocky, but the scenery more than compensated.

coffee and bore numerous traces of its legitimacy in the shape of grounds, completed the more substantial portions of the first evening attempt at inward relief. To top it off, Lou sprung a surprise in the shape of a home made cake, whose careful packing had survived the pounding of the endless thank-you-ma'ams to be found in any ninety-mile stretch of American road. The can opener—indispensable tool of the camper-helped provide an acceptable accompaniment, and when the empty receptacle had been flung out to repose by its mates that had supplied the first course, and the last chocolate crumbs had been removed from sticky, dusty faces with the poor man's napkin, we were a well satisfied but tired quartette. A loll in front of the fire until the bottoms of the pipes were reached, then Hal and myself undertook to shake down for the night.

"Thar's a hotel up the road a bit."

If the voice had dropped from Heaven it could not have precipitated worse confusion. The girls ran for cover in the tent, Hal grabbed the axe, and I looked quickly to see what was between me and the revolver under the cushions of the front seat of the car.

suspected the presence of such a thing within a radius of many miles. The spot was so thickly wooded and apparently out of the way that both Lou and Bessie had been regaling us with "This is the forest primeval."

It seems we were on our kindly disposed visitor's land, and seeing our fire, he had suspected the presence of tramps, which accounted for the shotgun he carried. We thanked him as best we could, explained our desire to avoid anything that savored of the interior of a house as long as the weather favored us and succeeded in getting him to accept a cigar and a seat before the fire.

"We wouldn't hev enny spite laid up agen you fellers and your machines, if some of yer wouldn't be so unreasonable in crowdin' a team offen the road, when we're haulin' loads."

"Why, Lem Higgins—that's—my brother in-law, he lives down the road here a piece, was forced into the ditch two days ago just above here by one of them big machines like your'n there, a'coming round the corner, full twenty miles an hour, and without a bit o' warnin'. Had two cords o' hickory and oak on, Lem did, and had to

dump every bit and load her up agen, in order to get them horses of his'n outen the ditch. Lem's sure got it in fer you fellers. His mad's up to the bilin' pint."

This and a great deal more to the same effect that our rural friend volunteered shed considerable light upon the manner in which the sins of the inconsiderate and reckless few made the farmer look upon the automobilist as an arrogant usurper of the highway. We listened attentively and could only deplore the fact that the arraignment was all too true. With the end of the cigar, he assured us we were safe from molestation where we were and bade us good night, promising to send one of his boys over with some fresh milk and eggs in the morning.

"Seven o'clock," yawned Hal, next morning, planting a well-directed kick on my anatomy that brought me back to earth. "No signs yet from the 'budwar' on the next alley," he added, jerking his thumb in the direction of the girl's tent.

"Oh, to the devil with keeping to any schedule," I grumbled, sleepily, meanwhile slowly extracting my lower half from the of milk and a small basket of eggs on the ground outside, as we lazily put on our shoes.

"Pleas retorn the pitsher," read Hal slowly from a scrap of can label of our repast of the evening before, held down by an egg in the basket.

"We sure will, hoping there'll be more good Samaritans who'll leave our breakfast on the dumbwaiter without blowing the whistie.

"A-a-all hands," rendered in the long drawn out rolling bass of an ex-navy bosun's mate by yours truly, brought forth giggles from the "budwar" that showed we were not the only ones alive about there, and soon there sallied forth the two spick and span ones, neat and dapper, with hair immaculately coiffured, showing how much more loath woman is to cast aside the habits of civilization on slight provocation than mere man, for neither of us had as yet made the acquaintance of the comb or wash basin.

After breakfast, we made things shipshape for the day's run and drove over to the farmhouse, where we made a vain at-



"What more entertaining and enjoyable than to be able to cast the burden of culinary cares on the shoulders of mere man for at least two weeks out of the fifty-two."

sleeping bag. "That's me," assented Hal, and in a breath, our carefully studied out plans to be on the road by seven every morning and to cover at least 90 to 100 miles a day, were forthwith swept off the slate. Moral, don't make any hard and fast rules for a loafing trip.

"There's our breakfast. Been waiting for us to turn out and eat it, all according to contract," said Hal, pointing to a pitcher tempt to pay for our breakfast supplies, either in coin or kind. Finally, our visitor of the night before compromised by letting the youngest of the boys ride with us as far as he felt like walking back. The temptation to be seen by his fellows in that point of vantage on the foot board was too great for him and he stayed with us right into the village.

A couple of hours' leisurely driving,

lengthened out somewhat by the necessity of replacing the right rear tube, brought us into Albany about one o'clock, and the hotels having the "ayes" on a vote on the lunch question, we left them at the Ten Eyck—two women naturally constitute a majority—and drove to the nearest garage to see if we could not get a quick repair job that would again put the punctured tube on the emergency list for future contingencies.

The second night found us about midway between Schenectady and Syracuse and though progress had been far slower than originally planned, we were quite content. We were again fortunate in locating well and were not disturbed this time, nor did any Samaritan, disguised as a farm boy, come looking for us with a milk delivery wagon, so we used the condensed article, though in the midst of one of the world's richest dairy districts. Then came the problem of stowing the opened can of condensed milk, which we had to solve temporarily by leaving it behind. After considerable search among the Syracuse stores, we were able to provide against future inability in this direction by investing in a couple of friction top tins. Hal thought we might want to keep perishable stuff at times and further added to our outfit by becoming the owner of a refrigerator basket.

The trip to Utica was uneventful, except where punctuated by the necessity of picking our way over stretches under construction or of making detours to avoid them altogether, in spite of which we averaged fair time. A short stop in Utica in the late afternoon, to replenish the larder and then we were finally headed toward our goalthe Adirondack region. It was getting toward striking time, but we kept on in the hope of finding a stopping place that was up to the ideal we had formed from our two nights' experience. Finally, approaching darkness made a compromise imperative and we rolled off into a field at the edge of a strip of woods, there being sufficient indications of a water supply near at hand.

If there is one job about a camp that is more irksome than another, it is being compelled to tote for some distance every drop of water needed. It is something that everyone is more than willing to pass on to the next man, and we always considered a water supply the most essential requirement of a camping site. Darkness found us not more than half way settled for the night and we rolled the car into position about 25 feet from our scene of operations, and lit the headlights. Viewed from the car itself, the illumination was ideal, but the acetylene lights made an uncomfortable glare to move about and work in, and we were half blinded during the few minutes we endured it. Sitting down or stooping brought us directly in the range of the lights and a few trials at meeting those white hot eyes and then peering into the darkness made us almost helpless. experiment of draping a handkerchief over the glass made a decided improvement, and a hand towel proved even better. We then rolled the car much closer and found we had an ideal means of illumination. was brought into service every night that we needed more than lanterns could provide in the way of light during the remainder of the trip. Lou suggested that one be left going all night as a means of protection, but we had long ago learned that the camper's best safeguard lies in concealment and that lights only serve to attract unwelcome visitors, so we saved carbide and insured freedom from molestation by voting the suggestion down. were by no means far enough away from the "hobo belt" to be entirely free from apprehension of a visit from some of these gentry and always picked our camping spots accordingly.

It is marvellous how soon one becomes accustomed to consuming three times his normal amount of breakfast with a relish unknown to the workaday routine. The third morning saw us quite settled in the way of making and breaking camp and the rule of a place for everything made the stowage of the new outfit in its canvas bags the work of a very short time. But the next morning held an awakening for us in more senses than one. We had broken camp and started up the road that brought us there the night before, when we had to slow up and turn out to let a car pass going the other way.

"Where you bound for, brother?" inquired its lone occupant, in that kindly fashion that makes probing into one's affairs by a stranger almost welcome. We unfolded our plans while he quizzically took in all the details of our machine and outfit.

"Adirondacks, hey? Well, I kind o' hate to discourage you, but I think you're on the wrong track. There has been one or two that got through this way last year, but they're not hankering much to try it over again, and you'll find the longest way round the shortest way of getting there. Come from the city, I suppose," to which we nodded assent amusedly. New York is "the city" to most upstaters.

"You certainly came some past, because you ought to have turned off at Amsterdam or Fonda to get up into the mountains," a piece of information, which though very welcome, was no little disappointment. "Good you didn't get much further, as you certainly would have got into a peck of trouble up above here," after delivering which piece of parting cheer, he got around us and went on, while we manoeuvered to get the car headed in the same direction. It was not reassuring to find that all our carefully mapped out plans had gone awry, putting us a whole day beyond where we should have turned north, but we made the best of it and tried to make up for lost time by making a little speed on the back track. In Utica, we took on a stock of emergency eatables so as not to waste any time stopping for lunch, but the morning was well advanced so that the best we could do was to make Fonda in the late afternoon, and to avoid any similar breaks, we stopped at the local garage and jotted down detailed directions. After making a few miles further we went into camp for the night. An early start the next day brought us to Indian Lake in ample time for lunch preparations, the road passing around its southerly end and up along the west bank. The scenery and the innumerable ideal sites for settling down that presented themselves, brought the touring part of the trip temporarily to a close. Here we loafed and fished away the afternoon and did the same with the following three or four days, an occasional side trip helping pass the time, but on the whole taking things philosophically, as the experienced camper should, nevertheless the necessity of being home again in a few days could not be lost sight of, though the longing to get a canoe and stay on the lake shore another week kept growing stronger upon us.

The next morning we broke camp and leisurely drove northward along Indian Lake, past Blue Mountain Lake and the end of Long Lake, then doubling back on a loop of road that brought us out at Pottersville, lying at the southerly end of Schroon Lake. This was the parting of the ways, for northward along Schroon lay the road to Lake Placid and the Saranac Lake region, that we had fondly hoped to reach within little more than a day's drive from Utica on our original route. Much as we would have liked it, the pleasure had to be foregone, as our leisurely pace of the first part of the trip and the two days lost made a return imperative. We compromised by driving northward the length of Schroon Lake, and then regretfully headed south again, vainly imagining the many

delightful mysteries that the road beyond must hold. Back through Pottersville, Chesterton, Warrensburg and Lake George to Glens Falls, where we arrived just in time to escape a heavy storm, which made us try the hospitality of the local hotel for the first time on the trip. Much as we had scorned the idea at the start, we found that in the ability to make stopping places suit weather conditions lay one of the chief beauties of an auto camping trip and we enjoyed the temporary return to civilization to the full. Then came the question of whether to finish the trip the next day by driving right through to New York without a stop, arriving home Saturday night, instead of Sunday afternoon, as originally planned, or of taking it leisurely and getting there the next day.

"Why not stop over again at our first night's camp?" from Lou, ably seconded by the observation on Bessie's part "that a Sunday in town, right after this, would be impossible," settled the matter, the fair ones again constituting an overwhelming majority. So we took things easy the next day, spending some time in driving around Saratoga Springs, then on to Troy and then down to the site of our first stop, with the preliminary precaution this time, however, of informing the farmer of our presence, quite as much for the supply of edibles thus obtainable as to insure against being taken for tramps, though we insisted on payment in advance, to which no objection was raised. But in view of our former treatment and the extremely reasonable tariff on this occasion, we unanimously voted our farmer friend a laurel wreathmentally, of course, for his hospitable atti-

Four o'clock the next day saw us home again, more than satisfied with our experiment and fully resolved to repeat it at the very next opportunity, our experiences providing an inexhaustible fund of conversation and making us universally envied by our friends.

Roughing It a la Motor

BY MONTGOMERY HALLOWELL.

Are you one of those blase old motorists? Have you used up every charming stretch of road within a week-end radius of your town? Have you exhausted all the thrills that the first two or three years of automobile ownership kept shooting into your system? Are you in that just-waiting mood—wondering whether the next thing to interest you will be anything short of an air ship?

Then get happy for here's a new one. Here's a trick that will revive every old joy of your early days of motoring. Here's a chance to remodel, revamp and refurnish throughout every one of those merry old, nearly forgotten thrills.

"Roughing it"—that's the answer. This

story wouldn't do at all if it hadn't really happened. So here it goes with names, dates and places. Seven of us, Majors Foster, Page, Fitch, Ayres, Chalmers, Dowling and myself were at luncheon. The day was the first Friday in December, last December—1908, to be exact. And the place, since you insist, was the Hoffman House.

I don't know how it started, and anyhow, it makes no difference, but before the coffee got to us we had begun to tell hunting yarns. And every man in the party began to feel that crazy longing that no city-bound, asphalt-weary, business-burdened working man ought to feel until vacation time—that longing for the woods and the wild things.

Motor fiends every one of us-we began to tingle and thrill with that riotous, blood stirring "call of the wild" that means guns and dogs and camp fires. You know-or if you don't, I'm sorry for you, that feeling has no more to do with motor cars than a rabbit. That is it never had, up to that time, for any of us.

But it does now. That's the story. The Major was the inspired human being who sprung the idea. "Getting there and getting back is what kills hunting for us chaps." Page had just said "Here it is Friday noon. From now till Monday morning we could all be out shooting except for one thing—there wouldn't be any shooting. It would be all traveling-out and back again."

The Major carefully put away what was left of his coffee and as carefully set down the cup. He didn't seem to have a thing on his mind. "Well," he said, "you know," just as if it were nothing at all, "we might do the trick with a car." What the rest of us said I don't know. Anyhow it makes no difference. Whatever it was we all said it at once.

The next five minutes developed a lot of things. The Major knew a place somewhere back in Lakewood where, by starting that night and allowing six hours for

"We'll sleep to-night," said the Major, "at a little place I know, about a hundred and fifty miles from here. I'll 'phone for midnight lunch and beds for nine, also for a guide and dogs. I hope those cars are all They'll need to be. right, Page. And Fitch, be sure to have a couple of axes. We may have to chop down some trees to get the cars through."

This sounded good to me—only I was glad they weren't my cars.

In two cars, loaded to the gunwales with a marvelous outfit, supplied by Fitch, that seemed to be made and packed so as to go just right on every available carrying space outside the cars, ten of us left Columbus Circle at eight o'clock.

At one o'clock we were at the little hotel, an hour beyond Lakewood. I'd like to tell about the fun of that run. But it was just a case of good roads, good cars, beautiful night and speed. Just a regular motor ride but this isn't that kind of a story.

Next morning the real fun started. With Captain Jenks, our guide in the leading car, it took those blessed cars just fifteen minutes to land us in the very heart of the bird country. Over deep sandy roads and through timber—the cars never turned a hair. To have walked it would have tak-



"It took those blessed cars just fifteen minutes to land us in the very heart of the bird country."

sleep, we could be on the birds by seven thirty the next morning. Fitch suggested making it a camping trip and offered to supply a complete auto camping equipments from tents, air mattresses, sleeping bags and folding stove down to tea spoons with food and every other accessory, all to be so completely folded and stowed as to leave all seats free to carry us with three guests and a guide. Page came to the front with a Chalmers "Forty" and a Chalmers-Detroit "Thirty."

en over an hour. Who says that motoring isn't the real way for busy folks to go a hunting? We had only two days and the cars were saving every minute for us for sport.

Then came another novelty to some of us-particularly the guide. To see the Major and Fitch and Dowling transform the rolls of plunder that had been strapped to the running boards into a complete camp in less than ten minutes was better than any fire drill I ever saw. Nothing needed, to live, move and have your being out of doors was missing; and everything was made to fit into everything else so that not an inch of space was lost in packing. By the time the rest of us had guns out of gun cases and had completed plans for shooting, the camp was ready.

I started out to tell about "roughing it" and not about the shooting itself; but right here I want to remark that, when it comes

For a couple of miles we just wound around, picking our way through the woods with no road in sight Talk about walking on eggs. That's nothing. Just try a ride in an expensive car through the trackless woods with an eight-inch ball of leaves hiding the holes and stumps.

Once the "Forty," which was in the lead, got tight up against it, and sure enough, the Major's prediction about the axes prov-



"And that noon day meal. How Broadway would have stared at the way it disappeared."

to birds, that strip of Jersey woods is good enough for me. When we got back to camp at noon not one of us had had less than a dozen shots.

And that noon-day meal. How Broadway would have stared at the way it disappeared.

Another lightning transformation act that would make a hit at Hammerstein's was getting every part and parcel of that camping outfit on the cars inside of fifteen minutes and we were off for another kind of shooting. "I guess this is bad" said Page ."Two kinds of shooting the same day. Major I would sooner be the father of this new idea of yours than the winner of the Vanderbilt cup.'

Our new destination was to be a certain inlet the Captain knew of on Barnegat Bay where he guaranteed us some good salt water duck shooting. By road, it was a two hour run. But the Captain knew of some short cuts that would save an hour. Page said he was game to try anything with the cars but swimming; so we struck out for a short way. That hour was worth saving, and besides wasn't there a chance of some new motoring sensations?

We didn't save all of the hour but we got the sensations.

ed right. Before the car could make a get-away, the Captain had to chop down a couple of six-inch trees.

At the edge of the woods we struck a ploughed field and we began to wish the Captain had given us plans and specifications of his boasted "short cuts." ever, the cars didn't seem to mind and finally we came out on a road. It was a welcome sight, too, even if it was deep sand.

After a fairly stiff climb of about a mile. we struck the decline leading down to the beach and, after another couple of miles through the woods, we halted at a spot that the Captain had chosen for our camp-sight for the night.

For a couple of miles we were strung out along the edges and indentations of the little bay. And pretty soon the guns began to "Bang," "Bang," all over the place. The birds were coming in thick. Everybody was busy and the dogs were beside themselves.

We had invented a way to crowd a month's vacation into forty-eight hours; but even we couldn't keep it from getting dark and soon the fun had to stop. But after all, which is the more fun—the shooting or the pipe and the talk and the loaf around the camp fire after the day's sport is done? We found the shore too cold, and again we thanked out lucky stars for the light-ning-like camp equipment and the cars. For in less than forty minutes we had picked up our traps and established ourselves again three miles back in the woods under a protecting hill.

How good that hunter's supper was! And how unbelievable it seemed as we sat around the fire in the evening, to think that the evening before we had been in the city and that the evening following would find us back in our civilized togs, on asphalt again! How we slept that night! How we hated to crawl out of the warm sleeping bags Sunday morning—even to eat another of those wonderful out of door

1 folding grate with canvas bag 31/2 lbs.
4 No. 8 chairs 41/6 lbs.
4 steel folding stools 2½ lbs.
2 folding aluminum lanterns 7 ozs.
4 folding wash basins 7 ozs.
2 shot guns and two rifles in each
car discretionary
2 fishing rods with reels, lines, hooks,
flies, etcdiscretionary
2 folding tables
1 toilet tent 6 lbs.
2 wall pockets 11/2 lbs.
1 No. 2 refrigerator basket 9 lbs.
1 folding safety saw 4 ozs.
2 military night marching compasses
on each car
1 No. 1 medicine case21 ozs.
1 hypodermic syringe 3 ozs.
All of the above articles were packed in

another of those wonderful out of door brown waterproof bags, with handles on

"But after all, which is the more fun—the shooting, or the pipe and the talk and the loaf around the camp fire?"

meals! And how we hated to break camp. But we knew we could do it again—and then again. That was the compensating thought. For we had discovered and demonstrated a new idea—the tabloid outing for busy sportsmen.

Below is a list of the stuff Fitch furnished, barring the guns. It is every conceivable thing needed for eleven men for three full days, and all packed to leave room to spare on the cars. The total weight, including the 106 pounds of food, was 203 pounds, the total cost \$135.00.

	Article.	Wei	ght.
2	automobile tents	1814	lbs.
	doz. 12-in. steel tent pins (per doz.)		
2	tubular steel telescopic tent poles	317	lbs.
	Fitch sleeping bags, style "A"		
8	No. 1 air beds	9	lbs.
	three-quarter axes and sheaths		
	No. 8 aluminum cooking outfit for 8	~	
	people in leatheroid case with all		
	accessories	15	lbs.
1	large aluminum, folding baker, with		
-	pan, bread board, canvas case and		
	two broilers	8	lbs.

bottom and side. In addition, foods, as per the food list below for eight people for one week, were carried packed in brown waterproof 9-inch bags:

Flour	1D8.
Corn meal10	lbs.
Beans 6	lbs.
Erbswurst 1/2	lb.
	lb.
Lentils 2	lbs.
	lbs.
R. baking powder 1	lb.
	lbs.
	lbs.
	lbs.
	lb.
	lbs.
Rice6	lbs.
	lb.
Soup tablets	
	lbs.
	lbs.
	lb.
	lb.
	lb.
	lbs.
Ducon illininini	lbs.
Direct potatocs in interest in the second	lb.
Enched hats trittering	
Dried onions ¼	lb.



My Hunting Trip in the Maine Woods

IRA H. MORSE.

On September 30, 1908, H. J. Tenney and myself left Lowell in my Pope-Hartford roadster and drove, the first day, to Bangor, a distance of 247 miles. The next day we drove to Calais, Maine, a distance of 167 miles. Then we fitted up for the woods and took on two friends and a guide, making five in the car, which was only adapted for four, and was heavily loaded at that. But we fitted an extra seat on the running board.

For camping we carried a large folding tent, two axes and a good supply of cooking utensils, all of these, with pillows, were strapped on over the hood of the car, incidentally showing our confidence that would not have engine trouble. We built a special box on the rear for our food, as we had to carry enough to last five days.

Leaving Calais, we rode to Princeton, 24 miles over bad roads. Then we took a back road for four miles. We then took a very bad logging road to Tomah Lake, a distance of 14 miles. It was the first automobile that had ever been through that section. People at the last house told us we never could get through, as there had been bad washouts that had taken bridges away and torn up the road, but in spite of this news we started in just before dark, having been delayed by a bad blowout of one of the tires. We got through all right about midnight, after fording two streams by building several rods of corduroy road, as the banks were very steep. One of the streams had to be forded a quarter of a mile below where the bridge formerly was.

Just before reaching the camping place

we repaired a weak bridge, but just as the car was almost across, the bridge broke and the rear wheels went down through and left the machine balanced in such a way that the five of us were able to lift the rear end out and push it over.

We passed through an Indian reservation and had lots of fun with the Indians who had never seen an automobile before. When we first struck their little camp, many of the braves ran to meet us and stood in silent awe contemplating the wonderful contrivance which had chugged through the woods with such a heavy load. They did not understand how it worked, but in wonder gradually gathered around to examine it.

Then I started the motor with a series of explosions that made every mother's son of them run to cover. Very few of them came back. They hid in the brush and some of them watched the machine from a distance. The women were frightened, fearing that it was some new kind of a gun with which to shoot deer. One old Indian guide was immensely pleased when we showed him how to run the car, although his fears returned when he saw the smoke from the exhaust.

We camped near Tomah Lake and built a garage cut of boughs of trees. The machine was left there until we were ready to return. We hunted for deer in the early morning, and then shot partridge until noon. They were very plentiful and flew all about us. I got my first deer one morning after a 14-mile walk, and when we came back we loaded it upon the car.

A North Dakota Duck Hunt

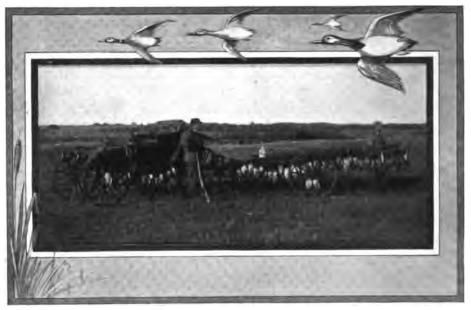
E. J. WALSH.

One morning last October my friend John O. and I, having arranged a duck hunt before hand, started about nine o'clock for Round Lake, which has an area of about seven square miles and is one of the good shooting spots of which this State has many.

Now in most duck hunting stories you run across, the hunters get out of a warm bed and hike to the points before sunrise so as to catch the festive duck with only one eye open, but that is a little too much a la Roosevelt (bless his heart) for yours truly.

We had not long to wait for our fun to begin, as off to the south of us on the open water were countless thousands of ducks and geese, trenches of which were constantly on the move. The first flock that swung to our decoys was a bunch of Mallards, and they paid toll to the extent of three. (Oh! by the way, we don't use pump guns.) Then a pair of Canvas-backs tried it and they liked our company so well both stayed with us.

As a matter of fact we put in more time picking up our ducks (on account of the wind) than in shooting them.



A good day's work for us; now it is up to the car.

Well, to begin with our equipment, first and foremost, we had to get there and also get our boat there. The motive power supplied by my Reliable was amply Dayton car, to the hind axle of which was fastened with a heavy strap the tongue of our two-wheeled boat cart. The boat is a sixteen footer, partly over, built by myself from plans supplied by a well known company of Bay City, Mich. The above boat and cart with its load and decoys, shells, oars and other duffle (not forgetting the "bait") will weigh about three hundred pounds and as the wheels of the cart will track about twelve feet behind the car; it should take a machine with a ward politician's pull to handle the load, but my little car did the trick on high gear with something to spare. We had some heavy sand roads to travel, but ten o'clock found us in a clump of rushes with our decoys riding the water in fine shape.

Along about the middle of the afternoon, John said, pointing to the pile of ducks, "Say Doc, don't you think we had better count bills and noses?" To which I agreed and a careful tally showed forty-seven, all either Canvas-backs or Mallards and we realized that our shoot for the day was nearly over, as we were within three of the limit.

The end came quickly as a few minutes later a pair of Canvas-backs tried to beat out two loads of number five, but unfortunately for them, were overtaken in the attempt; then a lone green head assayed the trick but John fooled him with his Parker. We picked up our decoys and struck out for the shore where our "Auto-mow-hay" was standing quietly (which I may say the horses don't always do when one leaves them securely? tied).

Now if we had a load coming down, we certainly had a good one to pull home with the ducks in the boat, but the little car delivered the goods.

Suggestions for Vacation Motoring

BY VICTOR LOUGHEED.

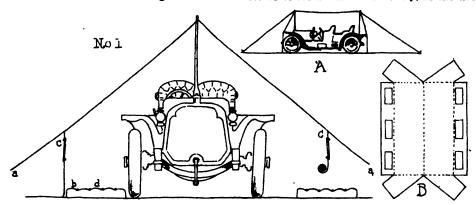
The Automobile as a Means of Transportation on Hunting, Fishing and Camping Trips

Time was, in the halcyon days when ownership of a motor vehicle was evidence on the face of it of great wealth or great extravagance, that for a car merely to run was considered enough of a triumph over the perversity of things to satisfy all possible aspirations of the most ambitious. But in these more degenerate times—when the automobile is becoming more and more the common conveyance of plain ordinary people, who insist not only that it operate but that it operate on coldly-calculated terms of businesslike economy and reliability—all manner of new utilities and applications are sought and secured.

By no means the least of these is the use of the automobile to cheapen and make comfortable the summer outings with which all reasonable contingencies, and for the secure conveyance of the various impedimenta.

Since the peculiar requirements for different trips and different individuals must in the nature of things vary through an immense range, it is possible in an article of this scope to suggest only a general outline of the plans to be made and the points to be regarded, rather than to attempt complete and detailed directions for the outfitting and conduct of motor expeditions. Certain main considerations are, however, essential.

To begin with, any sort of a motor outing will fall into one or another of two classes—cross-country journeys in which there is continual travel with new camps each night, and jaunts in which some objective point is quickly reached, a camp established, and this made the center of a series of local runs. Obviously, in the first



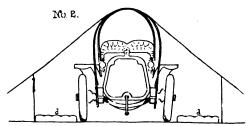
the round of business and household cares is annually intermitted, to the benefit of both brain and body for thousands of American families.

A motor outing may or may not involve "roughing it," about as the participants choose, though, of course, the character of the country it is intended to traverse will be a factor impossible to disregard. If the jaunt is made in an open car, away from or disregardful of hotel facilities and without elaborate equipment, there is certain to be some work and some discomforts. On the other hand, if every luxury available is to be provided, there are the closedbody types of machines with all the comforts of a pullman, including berths, electric lights, heating arrangements, cooking facilities, toilet conveniences, etc. most people, however, the happiest medium will be found in such an outfit as involves neither a specially-built car nor especially complex and expensive equipment. dentally, not the least pleasurable feature of the outing will be found in the scheming and contriving necessary to provide against case light equipment suitable for hurried and emergency use will prove most convenient, while in the second case the problem becomes more a matter of moving a considerable quantity of material with which to set up open-air "housekeeping" at the selected spot.

PROVIDING AGAINST CAR TROUBLES.

A first essential is proper provision for the operation and maintenance of the car. Nothing is more unpleasant than to have the legitimate hardships of an outing added to by car difficulties that could have been easily avoided by the exercise of a little foresight and care. If the route selected passes through territory in which the population is very small, or in which for other reasons there is litle catering to motor travel, common prudence will dictate a more complete equipment than otherwise would be necessary. Thus, in the arid regions of the west-a country of wonderful interest and easily traversable by modern automobiles-one must transport extra supplies of gasoline, water,

and oil, these necessaries not being readily obtainable en route, nor carried in sufficient quantities in the normal tanks of most machines. Also, in any locality, magneto ignition, though not inexpensive to instal, affords a positive-enough emancipation from battery troubles to be well worth securing. A liberal allowance, too, in the way of spare tire casings and tubes, together with a repair kit and anti-skid devices, provides assurance that tire difficulties will not become as serious a bugaboo as otherwise is likely to prove the case. A full kit of tools is always advisable, as also are some spare parts—varying in quantity with the experience of the driver and expected remoteness from fresh supplies. Waste in some quantity, though bulky,



weighs little and can be easily carried, being convenient to fill corners in packing besides serving its various purposes of car cleanliness. The women of the party will quickly learn that a handful of waste makes a convenient dishrag. Wire, even ordinary bale wire, is a not-to-be-despised adjunct. Its use permits repairs not possible without its aid, not to mention its general usefulness about a camp. Of especial importance for traveling in rough country remote from chances of assistance is a stout rope and a couple of tackle blocks, of such sort that with their aid the combined efforts of the party will suffice to pull the car out of any sort of ditch or mudhole into which it may be inadvertently driven.

HOW TO ARRANGE A PORTABLE HOUSING.

Some kind of portable housing is likely to be useful in almost any locality, no matter what the season, as a protection from sun if not from rain. For any but a permanent camp, it will be found well to have designed some protection that will cover the car as well as its occupants, and incidentally, utilize the car as a partial substitute for tent poles. The construction sketched in Fig. 1 shows how such a tent may be arranged—one pole fitted over a standard provided on the radiator cap and one at the rear of the car, being all that are necessary. Two rows of stakes will hold the ropes aa, while smaller, hooked stakes will catch the vertically falling flaps bb. The small sketch A shows how a rope ridge pole may be used, thus doing away with cumbersome tent poles. Windows of very thin celluloid, buttoned in as at cc with patent fasteners to avoid injury from rolling, will be an improvement over plain walls. The ends of the tent may be left open or may be closed with door flaps, in which case the complete canvas will be in one piece as at B. Setting up can be slightly facilitated and storage capacity increased by carrying the tent material down to aa, without the vertical walls.

A scheme somewhat similar to the foregoing is shown in Fig. 2, except that instead of poles, wagon bows are used to hold up the covering. In the case of an uncovered car this is of advantage in that in an emergency it can be used as a protection while driving.

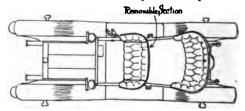
In both the foregoing, sleeping bags or pneumatic mattresses can be laid as at dd. Very comfortable pneumatic mattresses, with sleeping bags, pillows and covering combined, can be had for about \$20, weigh only 18 pounds, and roll into very small compass. For districts in which there are insect pests, a few yards of fine mosquito netting or bee veiling may make all the difference between comfort and misery.

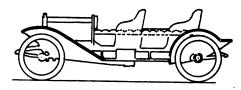
REMODELING CAR TO PROVIDE SLEEPING ACCOMMODATIONS.

For only two people it is not a matter of any great difficulty to remodel a car sufficiently to provide comfortable sleeping accommodations. Figs 3 and 4 show ideas that have been tried out and found practical. The last method is the less expensive and can easily be arranged on any runabout with flat rear deck.

IMPROVISING TABLES.

Of the other furnishings of a camp, the most convenient are stools and tables altho these are not really necessary. The



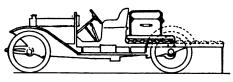


No 3.

first are to be bought in very light and compact folding forms, while there are even some of surprising serviceability constructed purely on the pneumatic principle. Tables can often be improvised from the floor boards or inverted cushions of a car, or they may be built from material gathered in the neighborhood of a permanent camp. For such work, as well as for the cutting of tent stakes, firewood, etc.,

any sporting goods house will supply the effective folding hatchets, to be carried in a belt. A small shovel, or at least a trowel, will prove its usefulness in small grading operations for beds, campfires, etc.

To light a camp, small acetylene chandeliers can be hung at convenient points and connected by rubber tubing to generator or gas tank. For more ambitious outfits, regular camp lighting generators are sold at low prices by acetylene goods



No 4

concerns. The portable gasoline lamps with mantle burners fed through "hollow wires" give still more light at less cost, for permanent camps.

It was Napoleon who said that "an army is a collection of stomachs" and what is true of an army in this regard is equally true of a party of healthy campers, the point of which is, that the commissary department warrants careful looking after.

CAMP COOKING AND UTENSILS.

The simplest means of cooking is, of course, the campfire, with dishes suspended over it or propped up by stones, but for those inclined to disregard the classics of primitive cookery, there are folding camp stoves of sheet metal, and gasoline and alcohol heaters, which are altogether more convenient and cleanly than their primitive prototypes. A good combination for the average case is the use of a small gasoline or alcohol burner for preparing hurried repasts, supplemented by a campfire for heavier meals. A compact modification of the modern "fireless cookers" will find some uses, and has the merit of keeping things warm as well as of cooking them.

It almost goes without saying that the best utensils are the nonbreakable. Especially dainty are the dishes of white enamelware, which can be had in sets in wicker cases, with knives and forks and spoons, or which may be bought individually. A cup, saucer and plate of this sort together with a knife, fork and a couple of spoons, should be provided for each individual in the party. Folding cups are handy to carry in the pocket. Besides the individual sets there must be a frying pan, and probably a stewpan or two, a double boiler, tablespoons, steel forks, meat knives, etc. Pocket flasks for drinkables may be required, but in some respects better than these are the various types of vacuum bottles, which preserve liquids hot or cold for prolonged periods. In territory where good drinking water is uncommon, a large canteen covered with blanketing, or a canvas water bag, is indispensable. One or two of the simple stone drip or suction filters, of a size to go in the pocket, will be desirable if brackish or muddy water must be used.

Salt, pepper, baking powder, flour, coffee, tea, etc., should be carried in screwtopped cans, proof aginst breakage and leakage. For butter, cream, milk, preserves, etc., mide-mouthed glass jars will do, if carefully protected against breakage. Individual tastes as well as opportunities for replenishing the supply will dictate the kind and quantity of provender to be carried, but a judicious assortment of canned goods, crackers, cereals, condensed milk, and the like, will always constitute a safeguard against starvation, and a little experimenting with the patent self-heating canned goods is not likely to be regretted.

Toilet essentials, such as soap and towls, tooth brushes, and pocket mirrors, will
hardly be dispensed with by the ladies,
however the men may regard them, and
cold cream is almost an essential to prevent chapping from the wind and allay sunburn. Nor should a small emergency case
of medical and surgical supplies be omitted. At the least it will be well to carry
a few simple remedies for stings, burns and
cuts, some bandages and surgical tape, disinfectants and stimulants. Safety razors
are also convenient.

HOW TO PACK CLOTHING.

Clothing naturally will be chosen to fit the necessities of a given case, but it is a safe general caution to insist that if any "glad rags" be carried in reserve they must be well protected in a suitable trunk. Good automobile trunks are less common than might be supposed, and in selecting them it is well to bear in mind that there are dust, moisture and vibration to be reckoned with. The trunks with tiers of trays or drawers have the merit that they avoid the piled up crush of things that otherwise may injure those on the bottom; some are even provided with mirrors, clothes hangers, etc. Almost as important as any other consideration is convenience, and though absolutely secure fastening is most essential, the necessity for frequent undoing of multiplied straps, buckles, ropes, clamps, etc., is likely in the course of a long trip to rouse the most patient to profanity. Needles and thread and provision for patches, though adding to the list of items adds negligibly to the weight and need not be worth much, to be well worth their room. Goggles and face masks, for sensitive eyes and skins, have recognized purposes, and will hardly be omitted.

FOR THE HUNTER OR FISHERMAN.

For hunting and fishing the expert will choose his outfit with little assistance, but for the tyro a few general hints will not be amiss. A modern magazine rifle for large game, a shotgun for fowl, etc., and a good automatic revolver for emergency shots or personal protection are standards. Ammunition can be most conveniently carried in a belt, which also will accommodate

a sheath or clasp knife for skinning or cutting up carcasses. A supply of salt or alum for temporary curing pelts that it is desired to save may be serviceable. For the fisherman a good jointed pole, with reel, bait cans, and baskets, are of general utility, as also are certain standard hooks and artificial flies. If any more serious onslaught is contemplated on denizens of wood and stream, a little reading on the subject will discover abundance of information. Knowledge of how to make the simpler deadfall, "figure-four," and other traps, together with a standard steel trap carried along, will enable almost any condition to be met, even to ridding camp of nocturnal marauders with a disposition to raid the commissary. A bottle of anisseed oil to sprinkle traps, effectively disguises the human odor and deceives the craftiest wild animals. Incidentally, in going into new localities a little reading up on game ordinances may prevent the arm of the law from adding other counts to its alleged contraventions of the speed limits.

RECORDING THE TRIP.

Camera and notebooks will be indispensible to those who care for permanent records of their more interesting journeyings. Of the former, the box types are far more suitable than the bellows forms for quick and convenient use from an automobile. And some of the very finest instruments to he had are the reflecting box cameras, with focal-plane shutters and high-grade lenses. The writer's fancy is for the stereoscopic forms as best calculated to make unique and perfect views of remembered scenes. An abundance of supplies should be carried, while a daylight-developing outfit, or use of the mantle of night as a dark-room will make the enthusiastic amateur independent of the professional finisher.

Besides notebooks, there should be had maps and road books. Regular automobile road books are best, but in their absence government topographic or post route maps are a great help.

Field glasses will help one to enjoy objects too distant to be readily visited. By all means the best are the prism binoculars, but these are also the most expensive. An aneroid barometer will tell altitudes above sea level very accurately, and a pocket compass is an unfailing guide to directions. It is not generally known to the layman, but most of the dealers in surveying instruments carry pocket range finders and inclinometers, with which distances and differences in elevation between the observer and any given point in sight can be very closely and quickly approximated.

CARE OF FIRES.

Particularly in the north and west it is the unwritten and written law that care be taken with fires. A few moments to select a safe spot for a campfire, or to extinguish its embers, may be the means of saving millions of dollars worth of individual and government property. Matches are safest carried in waterproof cases. Fire may be kindled when matches are gone or spoiled by using a connected spark plug to ignite a little gasoline soaked waste or a gun with all but the powder removed from the cartridge, will ignite dry leaves, waste, etc.

A caution that will impress itself sooner or later if good advice is disregarded, is not to run at night in unknown country, where population is thin and the roads not marked. In such conditions lights that amply illuminate the road are not sufficient. One needs the daytime view of the country in general to keep track of his position.

Although the outline of probable needs that has been attempted in this article may seem long, it is to be remembered that it will be modified to suit individual cases and that a mere list of articles always looks much more formidable than the same things in actuality, compactly packed and stowed.

DUST, MOISTURE AND VIBRATION.

As a final injunction let it be borne in mind that these are the evils to be guarded against above all others. In a long trip, dust will penetrate the minutest crevices and work into the mest intricate wrappings; water splashed up from roadside puddles will ruin things strapped to the running boards if inadequately protected; and vibration will almost extract riveted nails from trunks, etc. Guard effectively against this triumvirate of troubles, and in this day of improved cars and improving roads even a transcontinental trip becomes only a five or six weeks "joy ride."

JOURNAL OF A SEVEN DAY AUTO TRIP THROUGH NEW ENGLAND AND NEW YORK

BENJ. W. RIDEOUT

Realizing that the fall rush of business would soon be upon me, but bound to make the most of the intervening time, I decided to put my automobile at the pleasant task of conveying myself and family on a week's tour of New England. As my party was to consist of my father and mother, my two sisters and a brother, with the writer acting as driver, it was very essential that our Royal Tourist be equipped with the most convenient and practical accessories.

After consulting various catalogs we decided to visit, car and all, the establishment of Winship in Boston. When we finally left the store our auto sported on the rear rack, a special trunk containing three fairly roomy suit-cases. On top of this trunk we carried a folding tent in a canvas bag, while underneath, securely bolted to the rack, was a shallow trunk made to carry storm curtains, rubber blankets, etc.. All the extra inner tubes, jack

and other stuff were put in a round trunk which exactly fitted inside the extra shoe on the side of the car. On the running-board was strapped a roomy lunch trunk, above all waterproof, and arranged for Thermos bottles.

The above arrangements left plenty of room inside the tonneau for a couple of bags. Our robes and wraps were hung over a stout leather strap fastened to the rear of the front seat. Besides all this we securely stowed away a small camp cooking outfit obtained of Iver Johnson & Co.

SEPT. 19, NOON.

We were off in high spirits born of that delicious feeling of roaming where chance would lead us. Business cares we were leaving far behind and we were filled with a deep sense of comfort as our car throbbed away on its fascinating journey.

After a delightful run of 79 miles away from the Hub we found ourselves at a plece of shore not far from the famous York Beach. It looked very inviting, and as it bid fair to be a pleasant night, we decided to camp on a hospitable knoll overlooking the ocean. As the sunset colors were still tinting the waters they lent an added charm to our surroundings. Hunger, however, cut short our appreciation of the scenery and we were overjoyed to espy a lone fisherman well laden with clams and lobsters.

He was speedily induced to dispose of his stock, our cooking utensils and reliable lunch trunk were quickly brought into play, and we enjoyed a supper of an entirely different flavor from our usual city repast.

Supper over, we arranged our sleeping quarters. The top of the car was put up and the interior transformed by the aid of racks and blankets into comfortable couches.

Our leamto tent was fastened to the side of the car and amply sheltered the male members of the party. Underneath we piled fragrant "second crop" brought from a nearby clover patch and our sleeping quarters were complete. It is quite needless to state that we slept as only those can sleep who spend their time in the open.

SEPT. 20.

Breakfasting early we were able to get away at 7.30 for Portsmouth, N. H., thence to Bretton Woods in the White Mountains, 119 miles distant, where we arrived at 5.30 P. M. The scenery made brilliant by the early tinted fall foliage of the mountains where scarlet maples shone and glowed among the evergreens, had been a wondrous and continued delight. All day we had climbed steadily higher and higher above sea-level, stopping only for a hearty picnic dinner from our lunchean kit.

As dusk was coming on we took the short road across the valley to the Mt. Washington House, where we lodged for the night. The white frost on the board walks and the sharpness of the air made us willing to spend our evening near the fire where thoughts of winter would not intrude.

SEPT. 21.

Morning dawned as it only can unfold among the mountains, tempting us down the mountains to enjoy again to the full the gorgeous foliage far down the valley, through which we had passed the day before.

Returning in season for a hearty lunch we again put our tireless car into action, running to Maplewood and Bethlehem then over Mt. Agassiz. Thoughts of the famous trout-streams of the Franconia mountains disturbed some of our party, but despite that we persisted on our way over the "Three-Mile Hill" to the Profile House, to tie up for the night. Our record was but 43 miles, but—"Oh, such miles!"—we were content.

SEPT. 22.

In the forenoon we ran to the Flume by the Pool. Here it was necessary to employ a team to drive in, but it amply repaid us, as we had a view of the solemn Old Man of the Mountains and other great works of nature before we returned to the Profile House.

For the afternoon stunt we chugged up over Sugar Loaf Hill to Franconia and toward evening, a bit beyond Bradford, we happened on a pretty and secluded spot. Night fell on our happy party encamped in a quiet grove where the pine needles formed a carpet or couch, more luxurious than East Indian prince or Turkish monarch ever enjoyed. Distance, 51 miles from the Profile.

SEPT. 23.

To-day we followed the lordly Connecticut down through the green mountains to Claremont. After a bite at this point we wended our way down the charming valley to E. Northfield, Mass., arriving at 7.30, somewhat weary and with eyes smarting from a 111 mile run through the smoke of the forest fires, which had been so heavy at times as to completely obliterate our view and make cautious driving necessary.

SEPT. 24.

The Northfield Inn we left early this morning and the trip on down the Connecticut valley was continued via Greenfield to Springfield. On our way we passed through the town of Westbrook, the birthplace, the historian of our party reminded us, of David Bushnell, the inventor of the "American Turtle," as the Adam of sub-marine torpedo boats was called. This same relic-hunter added that we might find the remnants of the "Turtle" in a barn on the Bushnell farm if we cared to stop.

We preferred to save our time for something more entertaining, paying a hurried visit to Smith and Holyoke colleges instead. Springfield was reached in time for dinner.

Our hunger appeased, off we started northwesterly through the rugged Berkshire hills and over Jacob's Ladder to Pittsfield.

It was then after six and we were all too weary after our ride of 114 miles to be more than mildly interested in finding anything outside of a good hotel and a comfortable bed.

SEPT. 25.

After a splendid night's rest, we made an early start, ran down through Lenox, and Great Barrington, passed through the northwestern corner of Connecticut and over into New York State, lunching at a neat little inn at Millbrook, N. Y. From Millbrook we headed for Newburgh on the Hudson, where we spent the night, 157 miles from our starting point this morning.

SEPT. 26.

Enjoying to the full the beauty of the Catskills, we glided down the Hudson Valley from Newburgh to Nyack. Here we put the car on the ferry and ran on to New York City for lunch. As I write we are in New Haven for the night.

SEPT. 27.

This morning bright and early we left the University city for home, crossing amid more familiar scenes and eager for a sight once more of the dear old Hub. At noon we used for the last time on the trip our restocked lunch trunk, then ran on by way of Narragansett Pier and Providence to Boston, voting to repeat the tour at an early date.

We so thoroughly enjoyed our experience that I have roughly recorded this brief account, hoping that it may be followed by many a jolly party of tourists in the days that are to come.



Half a shelter tent which can be attached to the side of the motor car or to convenient trees.

NATURE NEAR HOME

Not all of those who know the joys of automobile camping go into the wilderness. They find nature nearer home and for brief periods of time can enjoy a mode of living akin to that of the gypsies, carrying such shelter as can be quickly set up in connection with the car at any stopping place.

Of the type of those who keep closer to civilization and yet gratify the human liking for the camp are Mr. and Mrs. A. W. Seaman, of Brooklyn. Half a shelter tent which can be attached to the side of the

motor car or to convenient trees is carried, and this protects them from the weather when they make a night stop in their tours about the country.

Mrs. Seaman is known among women automobilists as the winner of the Hol-Tan trophy in the race held last January from New York to Philadelphia and back by the Women's Motoring Club of New York. She is a southerner and an enthusiastic driver. Before she took to the use of the automobile she had acquired a reputation as a skillful driver of horses, single, tandem, four-in-hand and six-in-hand.

AUTO OUTINGS.

BY C. E. DURYEA.

There is no need to tell the pleasures of the touring auto. As a means of seeing the country there is no equal to it. But many do not know the handiness and pleasure of the auto for the little outing trips that can be taken at an hour's notice and on the afternoon of the day that is too hot to work. It is well recognized that many a holiday is spoiled by unsuitable weather, so any plan that permits the trip to be suited to the weather is a good one.

From personal experience I can cite some very popular swimming trips. Not at the natatorium, where the sun never shines, the crowd is not selected and the water is artificially heated, but to the creek where the air is clean, the sun bath not less valuable than the water one, the location secluded, the water clear enough to see the minnows that gather around and nibble at one if standing still and the bottom sandy and pleasant to walk on.

There are several suitable spots within two to five miles from the city where a swim can be enjoyed in the hottest part of the day with very little loss of time from regular duties. Pass the word around to the owners of two or three autos. Grab several muslin auto covers. Throw in an empty carbide can of large size. 'Phone the women to get the bathing suits and about the time the children get out of school be ready to go. The number of folks that can crowd in cr on a motor vehicle for a short, carefully driven trip is surprising. But if not all can be carried the first trip, make a second. This can be done while the auto covers are being put up for dressing tents and the first load enjoying the air and sunlight. The handlest trees are pressed into service by carrying the covers around the trunk and out to the ends of two branches, thence from tip to tip of the branches. This makes a threecornered structure well suited for a dressing tent. One cover suffices for a small tent; two make a very large one. Only a few safety pins are needed. The carbide can makes a pretty fair floating barrel. The ones who cannot swim have "water wings" which, once inflated, permit floating easily. The easy sloping banks permit getting the depth wanted. And the whole crowd seems to enjoy it better if not too deep. Diving for pebbles, bobbing for apples, riding the barrel and similar sports fill in a half hour quickly. The dressing occupies a little more time, but those first ready make the first trip home, leaving the remainder to roll up the tents, wring out the suits and towels and leisurely be ready when the autos get back. The relaxation from work, the reduction in bodily temperature, the pleasant though short rides and the unconventionality of the thing all afford the greatest relief from the oppressiveness of a sultry summer day.

But there are other days when the wind is too high or the water too muddy or the

swimming trip has no attraction. Then the outing must be sought along some other line. In many directions around Reading there are to be found places where wild strawberries grow, or where cherries unclaimed and largely unpicked abound. Mulberries are not so plentiful, but these, too, exist. Blackberries and raspberries are quite frequent. Huckleberries cover the mountain sides. Apples and various kinds of nuts are often found where no one apparently owns or cares. Of cherries this is particularly true. Dozens of trees grow along the fences and the over-ripe fruit drops into the road till it is covered as with a blanket of black, which stains the tires as they roll over them. Some of these are not the choicest varieties, but when fully ripe they are sweet and splendid eating. Within several miles of the city all of the ownerless trees are picked by those who have not the range of the auto user. This makes a longer trip necessary, but five to fifteen miles will bring trees of the luscious fruit into sight and reach, almost any season. Trees that are loaded one year may have nothing on the next. Locality seems to exert an influence. The cause that injured the crop on one side of the city may not have been active on the other side. Thus one year the only good unpicked cherries were found more than a dozen miles north and more than once we indulged in a delightful ride and a feast at those trees on a secluded road where the over-ripe cherries were falling to the ground and the sweet sun-kissed ones in the topmost branches tempted us to climb as we had not climbed since boyhood. The auto would be stopped under a well-laden bough. two or more members climb onto this and force it down where it could be reached by those who preferred not to climb. The others distributed themselves in the tree ad lib. No fruit stand product compares with fruit that is fully ripe on the tree and that is picked and eaten with the sunlight fairly radiating health from it. Rain washed, unhandled and self-selected. This is feasting worth while.

Of mulberries there are two kinds, and some years a shake of the limb will bring a shower of fruit into the rig that takes That one's some minutes to clean out. clothing suffers from stains is a matter of course. But what of it? This way of using the time is more restful and more healthful than rushing at railroad speed over dusty roads where goggles are needed to enable one to see. The little roads through the country are dustless. are so little used that not many teams are met; while some of them wind along the little streams and up through the mountains in a most picturesque manner. On many of the half bare hilltops are the short huckleberry bushes from under the leaves of which peep the fully ripe and tempting berries. A little climb, a snap or two of the camera, then for the berries. Only the choicest are chosen. A handful are quickly stripped and the leaves blown

away, leaving berries "fit to eat." Here again the air and the sunshine do their prettiest and life is worth the living.

If conventionality tires one, pack the reading matter and a lunch and seek the solitude of the woods or the hilltops. The auto has no choice. If fishing is one's hobby, follow the creeks. In either case, the solitude can be had by going far enough. Hammocks and camp chairs add comfort and a touch of home. The auto cushions can be comfortably arranged on the rocks or stumps. As evening comes on a camp fire adds to the cheer and the novelty, as well as serving to warm the sup-per or cook the fish. If you have ever eaten a freshly caught fish after being well baked in a sheath of clay till the clay was brick and the fish done to a turn with none of its own flavor lost, you know the joy of the combination of cutdoor exercise, a good appetite and good eating. If shelter is needed, heavy canvas is practically water-proof and is easily stretched over the auto and to close by trees so as to both cover the rig and make a shed at the leeward side, from under which a passing shower may be watched without worry.

If you want an ideal or idyllic legal holiday, telephone to some cross roads hotel a few miles out and off the main lines of railroad or trolley. Usually these are all but deserted on such days, for everybody rushes to the city to partake in the celebration. A typical country dinner, the table loaded to overflowing and everything clean and well cooked, is usually to be had for 35 cents or thereabouts. Specialties like fried chicken and waffles come a little higher. If you arrive early you can help kill the chickens and know they are healthful and fresh. If aeronautically inclined, these are the places to fly kites or send up hot air balloons; each according to whether the day is windy or calm. One calm Fourth of July I sent up the same hot air balloon four different times. Each time it was followed and recovered. This would not have been possible in a city. Kites are easily carried, for most of them are made foldable nowadays. Pull down the middle of the string, attach a bunch of firecrackers to it, fire, and let go. The crackers at once are carried high in the air and the bombardment takes place well up, where the noise can be heard far away and where the fire looks pretty at night.

Short over-night trips can be made without losing any business hours. Drive to some little country inn for supper, and after supper drive till dark. Then to bed. Both places can be secured by 'phone, if this is deemed advisable. Next morning early the return trip begins before breakfast and this is secured after arrival home or on the way. Many people turn up their noses at the small cross roads inn with its simple accommodations, but the good wife who presides over the cooking and personally sees to the beds, knows her business in this part of the country and one can always be sure of a good, clean,

comfortable bed and well-cooked meals. During cider-making time the odor of the mill may be detected at frequent intervals and fresh, sweet cider just as it runs from the press can be enjoyed. Vineyards, too, abound and grape juice fit for anyone can be had and all the more enjoyed because of the surroundings. No fermented or preserved product can compare with this. As well compare old or condensed milk with the fresh product as to compare the usual cider or wine with the fresh, rich, undiluted juice which you see being forced from the selected splendid flavored fruit. And the auto makes these pleasures possible because it increases the range of its owner. Where the hundreds of horse drivers get out a few miles and other hundreds of cyclists and pedestrians overrun the territory close to the city, the auto gets into a new field farther away. It follows roads that are little used and that are all the more picturesque because of their loneliness.

Even the little motor buggies have speeds about three times as fast as the average horse and so permit ranging three times as far in a given limited time. This means that one's area of pleasure is expanded nine times beyond that enjoyed by the horse owner. But in actual fact the difference is much greater. The auto never tires and hard or hilly roads do not stop it. It is used therefore on many of the most beautiful roads that horse drivers seldom frequent for pleasure. This added choice of roads doubles one's range which must be taken into account in comparison with horse driving. We are each the sum of our experiences. Our length of life is not measured by years, but by our experience and our actions.

The list of pleasures could be continued, but why add more? If you are an auto owner you probably have enjoyed these things. If not, get one now. New or second hand. No matter. It is utility you want. And second-hand autos were never cheaper. Wander aimlessly into the country. If something seems wrong with it, stop to the lee of a fragrant apple orchard now in full bloom and enjoy both the color and the fragrance while you get acquainted with the mechanism. Restfulness is not rushing through the country at railroad speed with all the passengers bracing themselves into the seats as firmly as possible and with every nerve taut; but in loafing along, enjoying every sight and odor of field, orchard and garden, of swamp and woodland, of hillside and valley. Not in watching the speedometer and preparing to brag about it in the smoky "was-air" at the club, but in watching the fleecy clouds chase each other across the valleys and the buzzards idly soar as they lock for food. In lounging in pretty spots of sunshine or shade as the weather may indicate, in listening to the singing birds or chirping crickets, is there rest and relaxation from the daily hustling routine that must be tried to be known.



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2

TIMER.

IT NEVER WEARS OFF!
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IT'S MADE OF METAL WITH A TOOLSTEEL RIM —THE FINEST SPECIAL STYRIAN

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SUPERIORITY:
LARGE ROLLER RUNNING
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DOUBLE BALL BEARING
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NO LEVER
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PRICES: 1 Cyl., \$6.50
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MAGNETO TYPE

DOUBLE STONE
THAT NEVER CRACKS

NOT AFFECTED BY OIL
ABSOLUTELY PROOF
AGAINST SOOT

FORMS PART OF THE MOTOR SAME AS THE CRANK

NEEDS NEVER TO BE? CLEANED

HAS 6 GRADUALLY INCREAS-ING SPARK GAPS

ABSOLUTELY GUARANTEED FOR ONE YEAR

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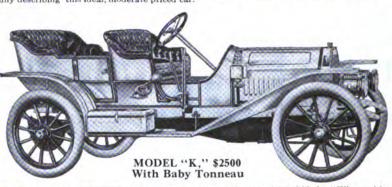
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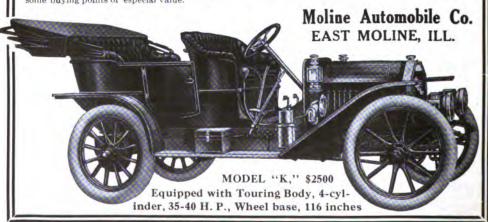
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The above illustration shows our Model "M" car. It has been acknowledged the best car value on the market at \$1500. It is a roomy, well built, 4-cylinder, 25-30 H. P. car, shaft or double chain drive, 107 inch wheel base, 34 inch wheels, 3½ inch tires and can't be equaled for the money. Write for Folder "C," fully describing this ideal, moderate priced car.



These two illustrations show our Model "K" car. We court comparison of Model "K" car, either touring type or roadster, with cars selling for \$500 more. You can pay more, but you can't get more real car value than offered in this model. Let us prove it for you. Write to-day for Catalog "C,"—it contains some buying points of especial value.





CAMPING OUTFITS MANUFACTURED BY THE NEW YORK SPORTING GOODS COMPANY

Generally speaking, any equipment that is suitable for a regular camping trip would be suitable for an automobile camping trip, were it not for the fact that the matter of weight and bulk must be seriously considered, when carrying capacity is so limited. For this reason the New York Sporting Goods Co., of 17 Warren St., New York City, has designed a number of articles suited especially for automobile use.

The style of tent shown herewith has the advantage of being easily erected as only one pole is required, and this is furnished jointed so as to take up little room in the car. It affords comparatively large floor space with comparatively little wall



N. Y. S. G. Co.'s Automobile Tent.

and roof bulk. Two can sleep comfortably in what is known as a 7½x7½-foot size, though it will roll up into a very small space, and, if made of "balloon silk," only weighs 8½ pounds. The price is \$17.25, or if made of waterproof drill, the price is \$11, but the weight is about double the weight of the silk tent.

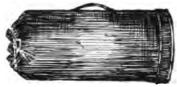
The best bed for easy carrying and real comfort is the pneumatic mattress covered with duck, costing \$17.10 and \$19.80, ac-



N. Y. S. G. Co.'s Pneumatic Mattress,

cording to size. Blankets may be had for from \$4 to \$10 each, the better being light, yet exceedingly warm. For very severe weather, a "Comfort Sleeping Pocket" is recommended, which costs \$25 and \$30 for the regulation weights (about 20 pounds) according to size, or they may be had in extra light weight, say 10 pounds, for \$50 and \$60. They are pneumatic, and a pump is furnished for inflating. They take up very little room when deflated and rolled in a bundle.

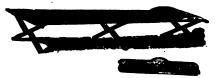
Duffie canvas carrying bags are a real necessity, and can be used for many purposes. The better grades are practically



N. Y. S. G. Co.'s Duffle Bag.

waterproof, and can be strapped to the side or rear of a car without worry about the contents getting wet. They cost from \$1 to \$2.50, according to the size and quality.

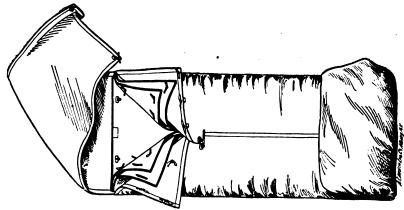
The folding cot or bed shown herewith weighs from 12 to 15 pounds, and when folded, occupies a space of 3 ft. by 6 in. As a quick, comfortable, portable bed, it is a great success when used in connection



N. Y. S. G. Co.'s Folding Cot.

with a sleeping pocket or a generous supply of blankets. Prices range from \$2 to \$3.50, according to size and quality of material used. A particularly popular style is the "Gold Medal No. 1," costing \$2.50.

There is quite a variety of folding furniture that might be taken if space permitted; for instance, a folding table, costing \$2.50; a washstand, 80 cents; a wash basin, 85 cents; a bath tub for \$9, and



flap or fly over the top, which acts as a wind-break and an extra protection against rain. Next to this is a thick, seamless woolen bag, fitted firmly, but soft and pliable, with a deep, thick nap, which is very strong and warm. Inside this is a bag of fine wool, also seamless, thick and warm. The fasteners are rawhide loops, and buttons passed through brass eyelets. Each bag is entirely separate and can easily be removed to wash, air or dry. This bag lists at \$15.00.

CAMPING AXE.

The axe shown herewith is fitted with a leather sheath and loop for carrying in the belt. It lists at \$1.25. Various other styles are offered, listing up to \$3.00 and fitted with the regulation guard.



PATENT COOKER.

Lilley's patent cooker makes a fine allaround stove, for ordinary cooking, boiling water, etc. It burns wood or denatured alcohol, or wood, coal and coke may be used, generating intense heat. The cooker is wind-proof. It lists complete with two pails and a 3-pint canister in a strong canvas bag, at \$4.50.



Another indispensable article to the tourist is a serviceable match safe. The one here illustrated is water-proof and nickelplated. It lists at 50 cents.

AUTOMOBILE CAMPING SPECIALTIES MADE BY ABERCROMBIE & FITCH CO.

The Abercrombie & Fitch Co., of 57 Reade St., N. Y. City, is cataloguing a line of tents, sleeping bags, cooking outfits, food outfits and, in a word, complete automobile camping cutfits, which will enable the automobile tourist to convey a party completely across the continent without being dependent upon hotels or even stores for accommodation or food supplies.

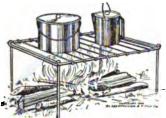
One of the necessities of the campers' outfit which is many times forgotten is the portable bath-tub. Quite a number of these are on the market and this company alone is offering two or three styles. A



very practical type of bath-tub is here shown, the same being 5 feet long, 27 inches wide, and 16 inches deep, and when folded is 5 ft. long by 5 ins. square, and weighs 16 pounds. The frame is of hard wood and is constructed so as to withstand rough usage and to keep in the same position no matter what weight the tub contains. It is made of closely woven duck, rubber coated. The tub is not suspended, but rests on the ground its entire length. It lists at \$8.50.

Duplex Folding Bucket: A very neat style of folding bucket is shown herewith which is made of japanned steel frames with canvas sides and pantasote bottom. The regular bail handle is fitted. It is made in two sizes: 10 quarts, weight 11/2 pounds, price \$1.50, and 12 quarts, weight

2 pounds, price \$1.75. Arizona Camp Grate: This is the most serviceable article for camp cooking of all kinds and especially for broiling. The accompanying cut shows the method in which it is used, also the simplicity of the device. The frame is very rigid and, next to a stove, is the best portable support for



pots, pans, etc. It folds up perfectly flat when not in use and is usually carried with a folding baker. It is made of strong steel rods, heavily tinned. Two sizes are furnished, No. 1, 141/2 x 10% in., weight 21/2 pounds, price 60 cents, and No. 2, 24 % x 121/4 in., weight 4 pounds, 6 cunces, price 85 cents.



Collapsible Meat Safe: This device is a very very necessary article for keeping flies away from meat, fish and provis-ions. It can be suspended in the tent or from the limb of a tree, affording a perfect protec-tion, yet leaving everything free to the air. It is made of extra strong English bobbinet which stands repeated washings. It is 36 inches long and 18 inches in diameter and weighs eight ounces. It lists at \$2.

Aluminum Cooking Utensils: The accompanying cut shows the aluminum cooking outfit which is a specialty of the Abercrombie & Fitch Co. This outfit has been

tested out by campers and explorers, engineers and army officers and has been given the highest praise. With the exception of the frying pans, all pieces are made of aluminol, which is a new and special alloy. This aluminol is harder than regular aluminum and is practically indestructible,



and will endure all manner of hard usage without serious damage. The steel frying pans furnished with the set are of best grade, highly polished steel, fitted with Darling's detachable handle. These outfits are made in various sizes for 2, 4, 6 and 8 persons. As an example, the No. 4, equipped for four persons, includes three different sized cooking pots, one coffee pot, one large and one small frying pan, four plates, four cups, four soup bowls, four knives, four forks four dessert spoons and four teaspoons. When nested together this outfit measures 10 x 11 1/4 ins., and weighs 10 pounds, 14 ounces. Price, including canvas bag, is \$16.60. The No. 2, for two persons, lists at \$9.85; the No. 6, for six persons, at \$26.50, and the No. 8, for eight persons, \$30.

Combination Knife and Fork: This concern sells a combination knife and fork which is a very handy contrivance. The knife and fork point are pressed together when not in use in such a manner that each point slips inside the handle of the other so that the device can be carried in the vest pocket. It is 7% ins. long and 34 wide, weighs 2 ounces and lists at 45 cents.

Automobile Medicine Case: The automobile medicine case, herewith shown, is designed especially for motorists and contains such articles and remedies as are most likely to be required. It contains the



following in tablet form: Boric acid, bismuth salic, cascara sag., 10-grain lead subac, chl. of potash and borax, 2-grain quinine sulphate, soda mint, comp. pagnacitm and carron oil, castor oil, aromatic ammonia, boric acid ointment, surgeon's plaster, court plaster, protective skin, oiled gauze, eye sponge, camel's hair brushes in tube, folding scissors in case, safety pins and ordinary pins in tube and compressed absorbent cotton, boric lint, wide, narrow and triangular bandages. These articles are put up in a strong metal case, size 71/2 x41/4 x2 inches, weight 11 ounces, price \$4.20.

Bobbinet Mosquito Proof Fronts: This concerns sells mosquito and fly proof fronts made of best English bobbinet at 10 cents per square foot. These fronts can be either attached to the sides and walls of a tent or to the front with a circular opening in center.

buckets at 60 cents to \$1.50. If you have removable extra seats in your car, they could be utilized, but it would be well to take along a few folding stools or chairs, which list from 30 cents to \$2.25 each.

If cooking is to be done on the road, the "Kamp Kook's Kit" is very convenient. It contains, besides a fire jack, a complete outfit of cooking and serving utensils, being sufficient for six persons. It can be



The Kamp Kook's Kit.

assembled into a very small space (about $14 \times 10 \times 8$ inches), weighing only 15 to 20 lbs. The price is \$6.45. Aluminum cooking outfits save quite a little in weight, and as the parts nest into each other, they occupy small space. They may be had for two, four or six people, costing \$10.80, \$18.00 and \$24.00.

Oil stoves occupy little space, and when kerosene can be had, are very convenient. A particularly suitable style for the autotourist is known as the "Jewel No. F J." It and weighs 1½ lbs. It is strong enough to support 300 pounds. The seat is made of heavy brown duck, reinforced and tacked



at corners. It makes a very comfortable seat and lists at 30 cents each.

WATERPROOF CANVAS BAG.
The Tryon water-proof canvas clothing bag is made in four sizes, 9 in. x 24 in., 12 in. x 36 in., 15 in. x 36 in. and 18 in. x 36 in., listing at \$1.35, \$1.65, \$2.00 and \$2.35.
Provision bags are made of special water-proof fabric, 8½ inches in diameter and of varying lengths to fit the 9-inch provision bags, and to hold up to 5 pounds of such foods as rice, meal, beans, etc. A 9-inch provision bag packed with these smaller bags of food holds about 35 pounds net weight.

The folding aluminum baker shown herewith makes a splendid baking and roasting device. By removing pins from side hinges the baker will lay flat for packing



- OPEN



The "Jewell No. FJ" Oil Stove.

can be easily taken apart and packed in a small tin carrying case. The price complete is \$5.00. Alcohol stoves may be had at from \$1.50 to \$5.00. (Description furnished by P. R. Robinson, President of N. Y. Sporting Goods Co.)

TRYON'S AUTOMOBILE CAMPING SPECIALTIES

The Edward K. Tryon Company, of 611 Market Street, Philadelphia, carries in stock a complete line of camping goods designed for automobile tours.

FOLDING STOOL

The folding stool, shown herewith, when folded, is 2 feet long and 2½ inches square,

purposes. When placed at the fire, the heat will strike both bottom and top of the pan and cooking will be done very evenly. It roasts well by placing the baker against the side of the camp stove. A bake pan is furnished with each baker. This baker, open, is $16 \times 18 \times 10$ inches, and together with pan weighs $4\frac{1}{2}$ lbs. It lists complete at \$5.00. A smaller size is also furnished, $12 \times 18 \times 8$ inches, weight $2\frac{1}{2}$ lbs., price \$3.50. A water-proof canvas case and strap is furnished at \$1.50.

KENWOOD SLEEPING BAG.
In the line of sleeping bags this concern is offering the combination Kernwood bag.
The canvas cover is made of heavy waterproof duck, colored brown, and fitted with a flap for front opening, as well as long

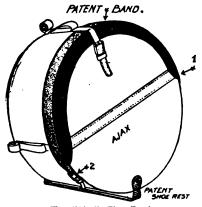
Noepel's Telescoping Steel Tent Poles: These tent poles are made in separate pieces and are especially recommended for automobile camping purposes. The poles are made of best grade seamless drawn steel tubing, all joints brazed and reinforced with electric galvanized satin finish to prevent rust. To erect an upright the second joint is withdrawn from the outside joint, reversed and inserted in the outside joint and the process repeated in a like manner until the complete pole is assembled. These poles are made in lengths from 8 to 12 feet, listing from \$3.50 to \$5.50 each. The 8-foot pole measures 11/4 inches in diameter and weighs 3 1-6 pounds. All poles telescope to 291/2 inches in length.

Goatskin Bottles: These bottles are made of genuine Basque Shahakoa, made in northern Spain entirely by hand out of one piece of goat skin and rendered water proof by a secret process. They preserve the color, flavor, coolness and purity of the liquid contained. The cork is made in two sections of unbreakable horn. The bottle is very pliable and can easily be rolled up and put in the pocket when empty. These bottles make an ideal flask for carrying wine or alcoholic liquors. The pint size lists at \$1.50, quart \$1.75, 1½ quart \$2, 2 quart \$2.25, and one gallon \$2.75

"AJAX" AUTOMOBILE TRUNKS

The Ajax Trunk & Sample Case Company, 191-93 Mercer street, New York City, have incorporated some new improvements in their 1909 tire trunk, and are offering a line of regular auto trunks.

The tire trunk is fitted with a rubbercoated canvas band on one side, while the other side is pulled tight to the strap and



The "Ajax" Tire Trunk.

buckle. This insures absolutely that no water or dust can enter into the trunk, as the band sheds the water in all directions. One of the most noticeable improvements is a steel shoe post, which fastens to the wooden sides of the trunk. This prevents

wear and breaking in at the bottom of the trunk where it joits on the metal tire holder when on the car.

The Ajax auto trunk shown herewith contains two or three separate suit cases, which makes a most convenient manner of



The "Ajax" Auto Trunk.

carrying luggage. This concern conducts a department for executing special orders, so that motorists can have their luggage carriers made to conform with their own ideas.

"WINSHIP" TOURING SPECIALTIES

The accompanying cuts show three specialties manufactured by W. W. Winship. 71 Summer street, Boston, Mass., which have been designed primarily for touring purposes.

The emergency lunch kit is used for carrying on the car a non-perishable lunch in the shape of crackers, sardines, olives,



"Winship" Emergency Lunch Kit.

"Winship" Thermos Bottle Pocket.

chocolate, Apollinaris water, etc., put up in a small leather case. This is to be stowed away under the rear seat and left all summer if necessary, and not to be used until some accident or delay occurs, when its use would be needed. This outfit is made in two grades, prices of which are \$5.50 and \$7.50.

Another article of merit is the Thermos Bottle Pocket. This is a soft leather pocket, made to hang on the robe rail with partitions in same for holding two Thermos bottles. It is made in two sizes for either pints or quarts. The bottles are handy to get at and are always upright, thus avoiding any breakage.

For the purpose of conveniently carrying storm aprons, the Winship curtain trunk will be found to be very serviceable. It consists of a thin flat trunk, which is bolted to the underside of the trunk rack. It

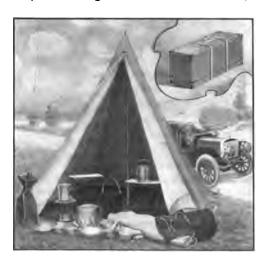


The "Winship" Curtain Trunk.

places the curtains out of the way, where they are handy to get at, thus nobody need be disturbed in putting up the top. The trunk will fold with rack against back of car in case top trunk is not carried. The list price of this trunk is \$14.00.

THE "GODFREY" AUTOMOBILE TENT AND OUTFIT

The Charles J. Godfrey Co., of 10 Warren street, New York City, is manufacturing the auto camp outfit, shown herewith. This outfit, suitable for two persons, incluses the following: One waterproof silk pyramid tent, size 6 x 7½ ft., which is guaranteed to be absolutely



The "Godfrey" Automobile Tent and Outfit. water-proof. This tent is furnished with one jointed pole, one set iron tent pins, one ground cloth which is water-proof and which is sewn in tent. Also two all wool gray blankets, one complete aluminum cooking set, consisting of one cooking pot

holding 7 pts., one cooking pot holding 10 pts., one fry pan 9 ins. diameter, one coffee pot, 2 plates, 2 soup bowls, 1 pt., 2 dessert spoons, 2 knives, 2 forks, 2 cups, 2 teaspoons. The complete outfit measures on the outside, when nested, 9 ins. diameter, 8 ins. high. Besides this is furnished one alcohol stove, 2 steel folding stools, 1 folding water pail and 1 folding water bottle. Entire outfit when nested is put in a fibre case which is exceptionally strong and durable. The size is 30 x 10 x 12, which is a convenient size, as same may be placed on the running board of an automobile. The fibre case is of the telescopic order. The price of the auto-camp for two persons is \$60.00. This company also furnishes a fiveperson outfit at \$100.

THE "CRAVEN" FOLDING HAIR BRUSH

The accompanying cut shows a toilet article which should appeal specially to the tourist. This outfit includes a folding hair brush, aluminum comb, and a beveled edge mirror, all three articles fitting into a



The "Craven" Folding Hair Brush.

handsome leather case, only % of an inch thick. The brush is made of the finest quality white bristles, which are made to stand up or lay flat by means of a small lever. The outside measurements of the case are 2½ x 4% inches. This article is made in four finishes, listing as follows: Gun metal, \$1.50; silver-plated, \$2.00; gold-plated, \$2.00, and sterling silver, \$5.00. It is manufactured by E. J. Sternfels, Flatiron Building, New York City.

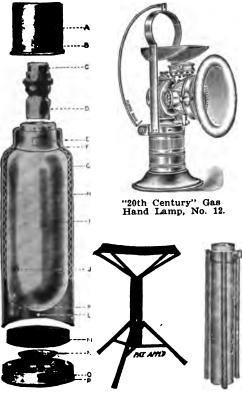
"NONKORODA"

Nonkoroda is an automobile radiator compound recently placed on the market by the Nonkoroda Co., of 25 and 27 New Chambers Street, New York City. It is claimed to remove and prevent the formation of rust, mineral and vegetable incrustation or scale on the inner surfaces of radiators, engine water jackets, and all pipes and connections that come in contact with the water. By the use of this substance these foreign elements are held in suspension and when radiators are emptied they will be drawn off in the form of soft mud which cannot adhere to the metal. It is put up in 2-lb. canisters listing at \$1.00.

THE "EVER-READY" BOTTLE

The accompanying cut is a sectional view of the "Ever-Ready" bottle manufactured by the American Electrical Novelty & Mfg. Co., of 304-22 Hudson St., N. Y. City. This view shows the metal case with the removable vacuum bottle in position.

One of the features of this bottle is the fact that when the inside glass bottle becomes broken it is only necessary to shake out the broken glass and replace a new



Sectional View of the "Ever-Ready" Bottle.

The "Hercules" Chair.

bottle. The bottom cap of this bottle is secured to the metal case by an ingenious combination of push button and three bayonet catches. In order to remove the cap it is necessary to push the button before giving a slight turn to the cap to the right which releases it from the catches. The letters in the illustration indicate as follows: A is a sanitary cup top which is made without threads so as not to cut the mouth when drinking from the same; B, the bayonet catch; C the patent spring top; B, sanitary ground glass vacuum stopper; E, bayonet slot on metal case; F soft rubber protective collar; G, metal case; H corrugated paper protective lining: I, glass vacuum bottle; J, improved bolster to prevent breakage; K, rubber cap on exhaust nipple; L, bayonet catch; M, felt pad: N. bottom spring cup; O, push button catch, and P, bottom cap. This bottle is also made with plain cork stopper and it is also put up in wicker and leather carrying cases. The bottle here illustrated is made in pint and quart sizes finished in either nickel or black, tan, or wine leather. De Luxe finishes can be had in alligator skin, pig skin, snake skin, etc. The price of the pint size in all nickel is \$4.50 and in the quart sizes, \$6.50.

THE "20TH CENTURY" GAS HAND LAMP FOR CAMPING AND TENT USE

The accompanying cut shows a lamp designed especially for camping and tent use. It is manufactured by the Twentieth Century Mfg. Co., 19 Warren street, New York City.

This lamp gives a light of about 110 candle-power and is capable of lighting up a full size camp. It is equipped with a guard over the chimney cap, so that the heat cannot reach the hand. It is also fitted with a long swivel hook, which may be used to hang the lamp on a tree or any of the tent poles. The lamp is made of brass, nickel-plated. Height over all is 14 inches. The front is 6 inches in diameter. Weight, 38 ozs. The list price is \$7.50. This lamp is also made with a 3½-inch front, weight 32 ozs., listing at \$6.50.

THE "HERCULES" FOLDING CHAIR.

The accompanying cut shows a folding chair designed especially for automobile use and manufactured by the Cherington Mfg. Co., Waukegan, Ill. This chair can be used in the tonneau of the car as an extra seat and can also at the same time be used in connection with a camping outfit. It folds up like a jack-knife and when collapsed measures 9 ins. long by 2 ins. in diameter. The top of the chair is revolvable. It is made of malleable iron and steel and is claimed to support 400 pounds. It is adjustable to 14, 16 and 18 ins. heights from the ground. The seat is made of heavy canvas 12 ins. square. The finish is in nickel plate and black enamel and the weight is less than two pounds. It lists at \$2.00.

THE "DOW" TIRE AND TOOL CASE

The accompanying cut shows a new style tire and tool case which has recently been placed on the market by the Merrill Manufacturing Company, Old South Building, 294 Washington Street, Boston, Mass.

This tire case is made throughout of Prussia iron, finished in any color desired, and is just a trifle larger than the diameter of the tire. The common size is made to hold two shoes, although it is made for three shoes or for one shoe. The latter in many cases slides under the rear of the car like a drawer, quite out of the way. The inner circle is used as a carrying space for other equipment. The upper half of

the inner space is divided, forming two shelves for jacks, tools, oil tanks, etc. The lower half is made to accommodate inner tubes, hats, caps, gloves, or even raincoats. This form is a regular model; the inner space is, however, made to order in any form and is large enough to accommodate a complete wardrobe for the chauffeur on long tours.

The cover, also of Prussia, is made with a handsome panelled front and locks securely with a small padlock. The case



The "Dow" Tire and Tool Case.

clamps securely to the running board of the car in the usual position occupied by tires and can be removed in a moment from the inside only by means of a turn buckle.

This tire case is also made with the lower half of the inner circle as an ice-chest or carrying space interchangeably. A metal perforated drip pan in the bottom keeps the water from splashing about. In the model made especially for long tours the ice-chest is made of copper. A monogram in raised letters completes the finishing touches to the case.

This concern also makes a specialty of the Bean puncture-proof tire and the Merrill speed launch.

"GORDON'S" LUGGAGE BAG

The Vehicle Apron & Hood Company, of Columbus, Ohio, have recently brought out the Gordon Luggage Bag, illustrated herewith.



The "Gordon" Luggage Bag.

This bag is made to hang on the back of the front seat, and is very roomy. It provides an ideal means for storing clothing, robes, etc., thereby keeping them clean and out of the way. The bag is made of best grade artificial leather, with patent leather lining. It is 30 inches long, 18 inches deep and 5 inches thick, heavily padded. It lists at \$10.00. This size is also made in green and red leathers.

A smaller size of this bag is also made which lists at \$7.00. It is $30 \times 16 \times 4$ inches, made of best quality artificial leather, lined with black enameled cloth outside.

THE "AMERICAN" AUTOMOBILE CURTAIN CASE

It is a well known fact that automobile curtains when left lying around the car

or under the seat will accumulate a lot of dust and mud which in time will crack the same and ruin the celluloid films, etc. In order to prevent this the American Vulcanized Fibre Co., of 500-507 Equitable Bldg., Wilmington, Del., have placed on the market the curtain case, a cut of which is shown herewith. This curtain case is made of fibre and is lined inside with a cotton lining. This case can be carried under the seat of the automobile or can be strapped on the back to the luggage carrier without any danger of harm ever coming "American" to the curtain. If the curtains

The American to the curtain. If the curtain Carain Case, are put in dry they will be found in just as good condition when taken out as when they were put in. It can be made in various sizes to suit different sizes of curtains. The case is riveted and the top is held on by a strap and buckle.

THE "AUTO" SHOVEL

The Union Furnace Mfg. Co., of Union Furnace, Pa., is offering to the automobilist a shovel designed especially for his use.

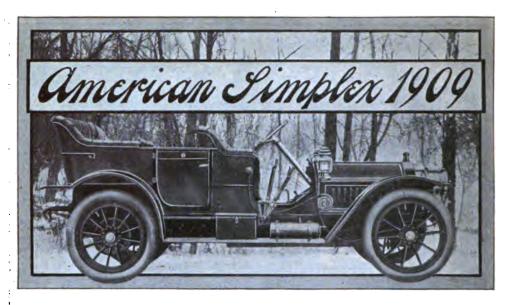
This shovel can be carried in the locker or tool box, or fastened to the footboard. It is especially desirable to have on hand



The "Auto" Shovel.

for cross-country driving or on bad roads. It is also a most convenient tool in the camping outfit. The blade is 6 x 8 ins. and the handle is 30 ins. over all with plain handle, and 26 ins. with T-handle.





HUGH DOLNAR.

The Simplex Motor Car Company, Mishawaka, Indiana, U. S. A., is offering for the season of 1909 a single construction of chassis in two lengths, respectively 117-in. and 110-inch wheel base. The large chassis is fitted with 5-passenger, 7-passenger and limousine bodies, and the shorter chassis is fitted with touring roadster bodies, having seats for either two, three or four persons, the rear seat or seats being stationary.

The American Simplex motor, 4 cylinders, 2-cycle, water cooled, in one size only, is used with both lengths of chassis. The cylinders are 5-inch bore with 5-inch piston stroke, crank box pressure cylinder charge supply, 50 B. H. P., at 900 R. P. M., actual reading against dynamo resistance.

The long chassis high-speed reduction is three turns of the crank shaft to one turn of the 36-inch rear wheels. The shorter chassis reduction is 21/4 turns of the crank shaft to one turn of the 36-inch driving wheels. Nine hundred crank shaft turns gives about 32 miles per hour, 3 to 1 reduction. These American Simplex 2-cycle motors are strong at 1600 R. P. M., and the longer chassis fitted with either 5 or 7passenger body can easily make 60 miles on a good road. The shorter chassis, with touring roadster bodies and 21/4 to 1 gear reduction, can make 70 miles, easily. The 7-passenger car makes from 10 to 15 miles per gallon of gasoline on fair roads and the roadster body cars do about the same, as they are commonly driven faster than the 7-passenger cars.

Much interest attaches to these large and speedy cars because they are the first elaborate and heavy cars to be driven by 2-cycle motors.

NEW PLANT.

The present 4-cylinder chassis construction was begun in 1907 and the capital stock of the company was increased from \$100,000 to \$200,000, and a brick factory, 384x72 feet, with a stock room addition on one side, 24x72 feet, was built in 1908. This commodious factory was also equipped best American machine tools, at a cost of in 1908 with a very complete plant of the over \$50,000. One hundred of these American Simplex cars will be turned out the season of 1909.

This is the first large and comparatively high priced motor car to be driven by a 2-stroke cycle engine. Gulick first placed two cylinders, 2-cycle, in a 5-passenger car, 106-inch wheel base, 34-inch tires. This first American Simplex car was roomy and speedy, had the same torque as that of a 4-cylinder, 4-cycle motor, was easy riding and strongly driven, and seemed to the writer to be in every way a very satisfactory and desirable automobile. But the company saw fit to take two years for designing, constructing and trying out the 7-passenger car with a 2-cycle, 4-cylinder motor, 50 B. H. P., at 900 R. P. M., first deliveries made in 1909, after the first one of their 4-cylinder cars had been driven across the continent to the Pacific Ocean and back, and had made about 50,000 miles on the road with no repairs or addition save tires and brake facing. This first car is now, after 50,000 miles of rough road work, as good as new, and is the car on which the "on the road" run of this story was made.

The entire construction of this 4-cylinder chassis is most elaborate. Nothing in the way of material is too good for it and

Your New Tires

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enough. It will pay you to go a little better this year than mere popular-priced tires, and insure best-possible-tire-service by equipping your car with Firestone Tires.

The fast-growing preference for Firestone Tires is simply a growing realization among motorists that equal service is not to be had in a cheaper product.

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Ave.; Los Angeles, 957 S. Main St.; Cleveland, 1918, 1922 Euclid Ave. no attempt has been made to lessen the very high labor production-cost by reduction in number of pieces or in number and class of finishing operations; ball bearings, aluminum and bronze castings and drop forgings are freely employed, while there is no stint in grinding, scraping and lapping operations. The chassis frame has

plates to air-tight seatings. The carburetor is among the most elaborate and costly ever seen by the writer, is Gulick's own design, and works well.

THE FRONT AXLE.

This is a steel drop-forging, no weld, I-section, greatest depth 2% inches, width

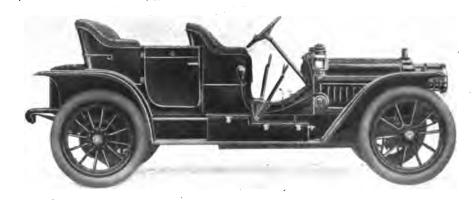


Fig. 1. American Simplex 1939 Close Coupled 5-Passenger Touring Car: wheel base 117 inches; tires 36 x i front, 36 x 5 rear; gauge 56½ inches. Motor, 2-cycle, water-cooled, 4 cylinders, 5 x 5 inches, crank-box pressure, cylinder supply, 50 B. H. P. at 900 R. P. M., Motor strong at 1800 R. P. M., allding gear selective, gear box integral with rear axle bevel gear housing, to give three forward specis and a reverue; weight about 3500 lbs. tanks full, everything on board. Price \$4000.00, including Simms-Bosed high-tension magneto, storage battery and coil box, 5 lamps, mats, horn and tools. Bodies fitted to carry spare tires. Cape top \$150.00 extra. Glass windshield \$50.00 extra. The 7-passenger touring car shown in the headpiece has the same tire and motor equipment. Weight about 3740 lbs. Price \$4000.00.

two widths, is raised in the rear, and has no less than five cross-girts, all of which are complex in form and two of which are greatly arched. Gulick prefers to make the gear box integral with one bevel gear housing member, aluminum casting, and gives these aluminum casting rear axle members very large diameters, so that no truss rods are needed.

The motor construction is most elaborate, all joinings fitted metal to metal, milled, scraped and lapped on surface

 $1\frac{4}{3}$ and 2 inches, web $\frac{4}{3}$ and ribs $\frac{1}{4}$, with $\frac{4}{3}$ fillet radius, as shown in Fig. 7.

The yoke opening is 6½ inches, the stub-axle pins are cylindrical steel, hardened and ground, 1-inch diameter, in hardened and ground steel bushes. The pins have hex. heads and heavy grease cups at the top, with a castellated hex. nut and splitpin at the bottom. The load is carried on a circle of 5-16 balls. The steel dropforging steering arm is applied, 7½ inches radius.

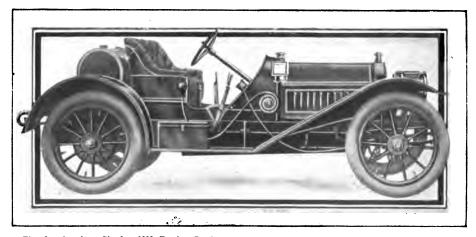


Fig. 2. American Simplex 1909 Touring Roadster. Wheel base 110 inches. All other chassis specifications ame as Fig. 1. Tank placed as shown, or tank under rumble seat when the body is fitted with one or two rumble seats, detachable. Weight \$300 lbs. Price as shown, \$3800.00, including 5 lamps, mats, horn and tools. Top extra. Rumble seats as specified, no extra charge.

The 1909 Limousine, same chassis as Fig. 1. Electric lighting with complete interior fittings. Price \$5000.00, fully equipped.

The front wheels are on Timken rollers, about 4½ inches total roller base, have 10 spokes, 1¾ inches thick. The spoke flanges are 7½ inches diameter, with 10 bolts. 7-16 diameter.

The stub-axle large diameter is 1 3-32 inches, and the stub-axles and axle-hubs are steel drop-forgings. The stub-axle pin axis is vertical, and the axle axis is at an angle of 2 deg. to the pin axis, and the low vertical spoke axis is also vertical. The front wheel tires are 36x4½ inches.

THE REAR AXLE.
This is made up of two principal steel castings, one for each end, a right-hand bevel gear housing member, a left-hand

nickel steel, oil tempered. The bevel balance gears are 5½ inches out. diameter, 1½ inches face, with 4 bevel pinions, 3½ greatest diameter, 26 gear teeth and 14 pinion teeth, balance gears and pinions chrome nickel steel, oil tempered; the balance gear hubs are carried on F. and S. annular bearings % diameter balls.

The live axles inside ends are cut with six grooves, ½-inch wide by ½ deep, and slide in the correspondingly broached, balance gear hubs. The out. diameter of these inner live axle ends is 1% inches for 5% inches, then reduced to 1½ inches for 10% inches, then tapered larger for 5 inches to 1 15-16 diameter at the flange, as

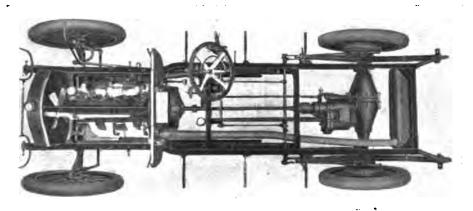


Fig. 3. American Simplex Chassis plan. The clutch is within the flywheel, and is 5 discs, 3 with cork inserts and 2 of plate steel. The torsion arm, steel tube, is very long and has its globed front end member restrained both up and down by colled springs. The rear axis is a steel tube, sleeves inserted in very large aluminum gear housing member hubs, one of these gear housing members being extended forward to take the sliding gear. The muffler is placed crosswise, in the rear. The fuel tank, not shown, is placed under the driver's seat.

gear housing member integral with the sliding gear box, and a front cover, these latter three principal members being aluminum castings of very large diameter, to give so great a resistance to vertical stress as to make it safe to omit the underneath truss rod commonly applied to the bevel-gear drive rear axle assembly. The construction is shown in Figs. 8 and 9.

The principal dimensions are, steel casting sleeves, 3 11-16 out. diameter, 3-16 wall, expanded inside, to a 7-inch diameter flange, bolted to the aluminum casting gear housing with 8 bolts, 7-16 diameter, nuts close on the screw threads, no split pins. The out. diameter of the aluminum gear housing members is 14½ inches, and the two lengthwise members are held together by a shoulder and 10 bolts, 7-16 diameter.

The sliding gear box is integral with the left bevel gear casing member. The front cover of the gear box outside flange measurements are 17 inches, horizontal and 12¼ vertical dimensions, faced flat to the gear housing flange and held with 13 bolts, 7-16 diameter.

The outside diameter of the bevel gear is 12½ inches, 8 teeth, 1% face, chrome

shown in Fig. 8. The wheels are on tapers, 1% large diameter, 1% small diameter, taper 4% long, retained with two Woodruff keys and a castellated hex. nut, and split pin.

THE SLIDING GEAR.

This is selective, 3 speeds forward and a reverse, side shaft at the left of line shaft, which is the bevel pinion shaft. The pinion-shaft large diameter is 1% inches and the side shaft large diameter is 1½ inches, both shafts are in F. and S. annular bearings, %-inch balls.

The bevel pinion shaft is prolonged inside the pinion, 1 3-16 diameter, in an inside F. and S. annular bearing, 11-16 ball diameter, making an excellent pinion support. The speed-change gears are chrome nickel steel, oil tempered, largest gear diameter, 7% inches, gear faces from 1% to 1% inches, all gears cut 5, d. p.; these large diameter and face gears have done over 50,000 miles with only slight wear. The bevel gear housing and gear box members are fitted oil tight, metal to metal, and all gears are packed in heavy grease.

SPRINGS.

The springs are all half elliptics, front springs under the chassis frame, rear

springs outside the chassis frame. spring eyes are fitted with hardened and ground steel bushes, and all spring-eye pins are steel, hardened and ground, with heavy grease cups in their outer ends and grease holes through to the middle of the spring eye. The front springs are 40 inches long by 21/4 inches wide, 9 leaves, lipped, 2 bands on each end, first band taking 5 leaves, second band taking 8 leaves, perched 19 inches, front spring eye to middle of front axle. The rear springs are 56 inches long by 21/4 inches wide, 11 leaves, lipped, 2 bands on each spring end, first band taking 5 leaves, second band taking 9 leaves, springs perched 27 inches, from rear eye to the rear axle middle.

TORSION ARM.

This is made of steel tube stock 2 inches out. diameter, % bore, by turning the taper on the forward part and reaming the hole at the rear end to lighten the arm. The arm tube length is 62% inches. The rear end is finished to 163-64 diameter for 10½ inches length. The front end diameter is 1½ inches. This arm terminates in a globe 1½ inches diameter at the forward end, the globe having a shank, 1-inch diameter, fixed in the arm-bore front end by reaming the tube-bore, shrinking and fitting a 3-16 diameter cross-pin.

The globe is in half-boxes, closed by a stiff coiled spring, the box casing having a stem sliding in a globed guide, top and

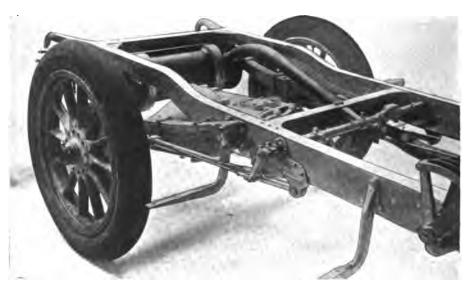


Fig. 4. American Simplex Chassis rear part. This illustration shows the spring and brake-rocker brackets and the muffler placing, and gives a good idea of the elaborate detail construction and unusual strength of all the rear part of this chassis, which has endured 50,000 miles of rough road work with no failure anywhere. All brakes are internal with expanding shoes, fiber faced, the brake drum having two integral drum surfaces, one inside the other, with an air space between them. The brakes are not applied through eveners, the brake rods being screw adjusted to length for obtaining equal brake action.

front springs are seated on leather and have bronze clip-plates on top, ribbed at the ends to retain the clips. The rear springs are on capped revoluble perches, seated in finished journals in the steel casting rear axle sleeves.

THE STRUTS.

These are steel tube bodies, 1% out. diameter, % walls, with drop forged eyes pinned and brazed into each end. These steel eyes are soft, with steel pins, % diameter, hardened and ground, hand oiled.

The struts are fixed in length, and extend from eyes integral with the steel casting axle sleeves, to Parson's bronze bracket eyes, the brackets being riveted to the chassis frame sides. The rear axle ends crosswise positions are fixed in chassis assembling and remain unchanged, as there is no strut-length adjustment.

bottom coiled springs being placed to resist the rear axle torsion in the usual man-

THE CHASSIS FRAME.

The frame is a most elaborate construction of pressed steel side frames, raised at the rear end, and applied spring eyes front and rear, steel casting eyes in front and Parson's bronze castings in the rear. carried inside the chassis frame sides and rear cross-girt.

The greatest chassis frame depth is 5 inches, 2 inches general width, 11-64 stock thickness. There are 5 cross-girts, one with a high rise and one with a low drop, all as shown in the photograph reproductions. The chassis frame is in two widths, 35 inches and 31 inches, there is no subframe, the motor base having one point of

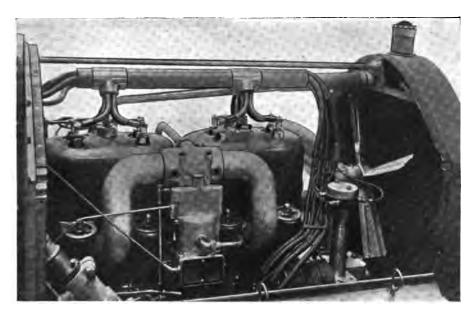


Fig. 5. American Simplex motor in position in chassis, right side, showing the carburetor with supply pipes descending to the dual-unit cylinders on either side, the top of the magneto, the wiring casing, the fan and the commutator. The water circulation is by a centrifugal pump, spiral gear driven from the crankshaft. The magneto is bevel-gear driven from the pump shaft, which has a crosswise placing in the gear cover. The ignition is a complete double system, two spark plugs in each cylinder head, with storage battery and magneto.

reinforcing members about 66 inches long

support forward and two points of sup- by 1/4 thick, in two lengths, 1% and 3% port on the chassis frame sides near the inches, retanied by rivets. The whole of motor base rear. The frame sides have the chassis frame is cold riveted. The chassis frame rear-end rise is 21/2 inches.



Fig. 6. American Simplex Motor. Left side. The exhaust pipe, in two sections, is gray iron, the two sections being slipped into each other to permit heat changes of length. The fan column is shown at the left, and the Lunkenheimer reducing valve at the right is piped to the exhaust and to the gasoline tank to maintain a one-pound tank pressure. There is also a hand air-pump on the front board piped to the gasoline tank. The top of the 10-lead mechanical oiler shows under the exhaust pipe, and the tapering top-water-tube is shown above the cylinders.

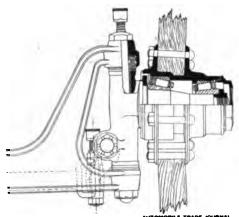


Fig. 7. American Simplex front axie, stub-axie and front wheel hub construction. The load is carried on a circle of 5-16 in. diameter balls, making easy steering. The front wheels are on Timken rollers. The axie is at 2 deg. angle to the vertical axie pin, and the low spoke axis is vertical. The steering arm is applied to the stub axie hub. The whole front axie construction is most substantial, and, it is claimed, has shown no fault of any kind in 50 000 miles of very rough road work.

THE RADIATOR.

kind in 50,000 miles of very rough road work.

The radiator is supported on globe washers seated on the chassis frame sides, under the radiator brackets, with bolts and springs to press the brackets on the

globe washers, and a screw-adjusted radiator-top stay-rod to the front board.

THE FAN.

The fan is gear-driven by a vertical shaft and spiral gears, has 4 aluminum vanes applied to a bronze spider applied to a steel shaft. The vertical shaft is spiral gear-driven from the crank shaft and the fan-shaft is driven by hardened steel bevel gears from the vertical shaft. The vertical shaft and the fan-shaft are in 2-point ball bearings. The fan has 4 vanes, is 17-inch out. diameter and makes two turns to one of the crank shaft.

THE AMERICAN SIMPLEX MOTOR.

This 2-cycle motor is 4 cylinders in dual units with integral water jackets, all gray iron. The cylinder bore and piston stroke are each 5 inches. The exhaust port top is 1 inch above low piston position, and the intake port top line is % above low piston position. The engine is 3-port and the third port is open % when the piston is at high point. The piston is 6 5-16 inches long, and has a slightly crowned head, with a raised and braced integral deflector, 1% high. The port bridging and circumferential dimensions are not for publication. This motor shows 50 B. H. P. against electrical resistance at 900 R. P. M. and is strong at 1800 R. P. M. The speed of this touring car chassis, driving wheels 36 inches diameter, one turn to three turns of the crank shaft is nominally 50 miles per hour, though it can give 60 miles on a good road.

The connecting rods are now Parson's bronze bodies, which give satisfaction but may be changed to steel drop forgings. The rods are 10 inches long, C. to C. The piston pins are fixed in the pistons, are 1 3-16 diameter, with 11-16 diameter holes 11/4 deep at one end and 31/4 deep at the other end with a wall 1/8 thick between these pin central holes, the pin and rod oiling being from an oil basin and oil hole on the top rod-end, which has a bearing

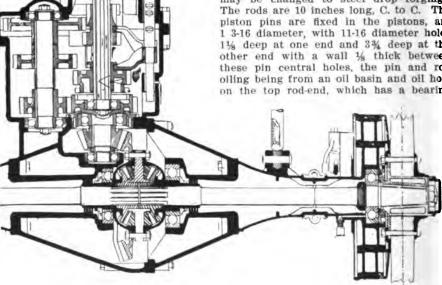
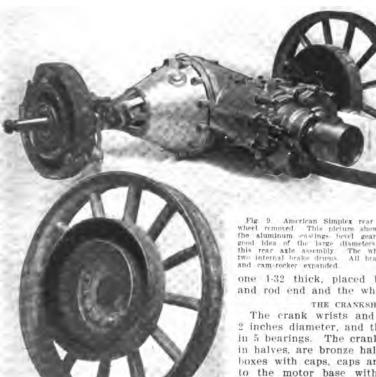


Fig. 8. Rear axle and sliding-gear box and sliding-gear construction, with the brake construction. The whole rear axle and sliding-gear construction is most elaborate and of unusual dimensions and great strength. No truss rod is placed under the bevel gear housing, which is of aluminum, gear box integral with the left hand housing member. All journals are in F. and S. annular ball bearings. The balance gear is bevel, and is hardened steel. The live axles are tapered, large ends outside.



2% long on the piston pin. The piston pin is retained by a % screw in each piston hub, screws tapped into the pin-wall and turned hard on copper washers curved to fit the pistons inside, these copper washers having lips turned up to retain the screw heads after the screws are turned home. The copper washer lips must be turned down before the pin screws can be removed.

The pistons have 3 packing rings over the pins and one at the lower ends. The rings are eccentric, and are 5 13-64 inches out. diameter when free, the greatest ring thickness is 3-16, least thickness 1/8. The ring cuts are 45 deg. angle, and the ring ends are slotted and have steel tongues 1-16 thick, fluished on the out ends of 3-16 diameter studs screwed in the piston groove bottoms. The piston ring-grooves are 5-16 wide by 13-64 deep, as shown in Fig. 11, piston photograph reproduction.

The connecting rod top ends are uncut and are bushed with special bearing bronze sleeves, forced into the rod eyes. The connecting rod lower ends are capped, caps held with 2 bolts, 7-16 diameter having castellated nuts, split-pin retained. The rod boxes are die-cast white metal, with six brass liners, 5 each 5-1000 thick, and

American Simplex rear axle exterior, with one wheel removed. This picture shows the gear-box side of the aluminum castings beecl gear housing, and gives a good idea of the large diameters and great strength of this rear axle assembly. The wheel removed shows the two internal brake drivins. All brake shoes are fiber faced

one 1-32 thick, placed between the cap and rod end and the white metal boxes.

THE CRANKSHAFT

The crank wrists and journals are all 2 inches diameter, and the crank shaft is in 5 bearings. The crank shaft boxes are in halves, are bronze half-boxes in bronze boxes with caps, caps and boxes held up to the motor base with 9-16 studs and nuts; both the box and cap are flanged, flanges finished inside and scraped to fit air-tight on the motor base and pit seatsides, to prevent leakage from one pit to another. The clearance filling disks are of aluminum, cored to leave 5-32 walls, are slotted to fit the crank arms, and the fillers are held to the crank arms with 3 screws, 5-16 diameter, one in the middle and one at each end. These filler retaining screws being tapped into the crank arms. The maximum crank box pressure is about 8 pounds. The side-pipe is nearly circular in section, about 2 inches diameter, to the intake port, and the third port passage to the crank box is about the same.

IGNITION.

A double ignition system is used, there being two jump-spark plugs in each cylinder, one, wired to the Simms-Bosch high tension magneto, in the middle of the cylinder head, and one spark plug close inside the deflector upright, wired to the coil. The current supply to coils is from a storage battery. The spark plugs are about 2 inches apart center to center, and the simultaneous use of both sparks does not cause the motor to accelerate without change of throttle position, showing satisfactory ignition and combustion with either ignition system alone.

THE FLYWHEEL AND CLUTCH.

The fly wheel is 17 inches diameter, 6 inches face, rim 1 inch thick in front of the web, and 11/4 inches thick in rear of

the web, weight, 79 pounds. The clutch is two steel disks, 14% out. diameter by % thick, and 3 gray iron disks, with 80 cork inserts 1 inch diameter in each. clutch is forced into normal engagement by 4 coiled springs, tempered steel, about 880 pounds, total spring thrust. clutch disk hub is on two F. and S. annular ball bearings mounted on the rearward prolongation of the crank shaft. The propeller shaft is made in two lengths, flange

THE AMERICAN SIMPLEX CARBURETOR.

This is all of ordinary form, regulation elements, annular cork floats concentric with a single stand pipe and a sectionoperated air valve linked to raise the needle valve and increase the fuel supply as the piston suction raises the air valve. Although this motor is 3-port the carburetor suction is not subject to sudden and violent changes because there are four motor cylinders, so that one cylinder



Fig. 10. American Simplex 2-cycle cylinders. The exhaust ports are open 1 inch above the low piston head, and the intake ports are open % inch above the low piston head. This cylinder is 3-port, and the third port is open % in. when the piston is at high point.

The intake port has three bridges and the exhaust port has one. Port circumferential extent not for publication. The cylinders counterbore takes a steel ring, seated in a motor

sucks the carburetor through nearly 180

connection, with Hooke-joint forks at front and rear ends. The cross trunnions are 1% diameter, the cross is 4% out. diameter, over trunnion ends, is steel, hardened, and the trunnions are ground, and work in hardened and ground bushes carried inside the sliding clutch hub and protected by a cupped leather slipped on the universal joint casing and retained with two hose-clips with screws. chrome nickel steel propeller shaft body is 1% inches diameter, and the propeller shaft length. C to C of joint trunnions is

deg. of crank angular advance. Hence, as the column of mixture in the carburetor piping is highly elastic, from 250 crank shaft turns per minute upward the carburetor intake air current shows but little fluctuation. The gasoline tank is rectangular, of galvanized iron, riveted and soft. soldered, is placed under the driver's seat and holds 20 gallons. There is no reserve gasoline supply. LUBRICATION.



The lubrication is by mechanical oiler spiral gear-driven from the pump shaft, 10 oil leads, with individual sights, visible when the hood is lifted only, four to the cylinders, opening into cylinder grooves about %-inch below the bottom of high piston position; these 4 leads oil the pistons and also replenish the splashpools; 5 leads go to the crank shaft bearings and one to the top of the fan drive, from which the oil descends to lubricate the fan journals and gears.

MUFFLER

This is cylindrical in form, 30 inches long by 91/2 inches out. diameter, with a total of six concentric shells, all of sheet iron about 22 gauge in thickness, exhaust just going into the inner shell 31/2 inches diameter, and shell perforations forcing the exhaust to travel some distance before finally reaching the atmosphere through two exterior segmental pipes, opening underneath to the rear. This muffler gives complete silencing.

The brakes are all internal inside of two brake drums, malleable castings, single integral web; the internal drum diameters are 15 and 10 inches respectively, with 21/4 inches air space between the drum sur-

Fig. 11. American Simplex motor 2-cycle piston, gray iron, integral deflector with two supporting ribs on the outside. The whole top of the piston, including the deflector, is hand finished by filing, scraping and polishing with emery cloth, so as to avoid pre-ignition. All piston rings are eccentric, have 45 deg. angle cuts, and the ring ends have cuts 1-16 inch wide which take the flattened ends of studs acrewed into the cylinder wall.

51 inches for the 117-inch wheel base

chassis.



Fig. 12. American Simplex motor crankshaft. The cranks, 2½ inches throw, are in pairs 180 deg. apart, pair groups 90 deg. apart. The rear group, next the flange, is 90 deg. behind the front group. The crankshaft turns top to driver's right, contrary to usual practice, to reduce the right hand front spring load as much as may be. The cylinders' firing order, from the rear, is 1, 3, 2, 4. The filling bobs are cored aluminum castings.

faces. The malleable casting brake shoes are jointed, are cam-rocker expanded and are asbestos faced. The larger drum is 2½ inches face, the smaller drum is 2½



Fig. 13. American Simplex chassis control. The clutch fork hangs down from a bracket fixed in the side of the top of a high arched chassis frame cross member. The pedal treads are hinged, and the pedal tread stems have cross-holes \(\frac{1}{2} \) inch apart to take cross-bolts through the pedal lever eyes, so that the pedal tread can be located to suit the driver's convenience. The front board carries the hand-worked air pump for tank pressure at the left, with tank pressure gauge close to it. The torsion arm spring casing shows in front of the control cross-girt.

inches face. The brakes are not applied through eveners. The large diameter is the ordinary brake drum and the small diameter drum is the emergency brake drum.

CONTROL.

The spark and throttle levers are ratchet retained on top of the steering hand wheel, see Fig. 13. The steering action is right and left screw threads, external and internal, in a well known form. The outer one of two outside hand levers, at the driver's right is latched, and is pulled backward to apply the emergency

brake shoes to the smaller internal drums on the rear wheel hubs. There is no interlinking of control operations.

The inner hand lever has 5 positions, is in two slots, and is moved to effect the gear shifts. The two large pedals have swinging pedals jointed to stems which can be adjusted in eyes at the free ends of the pedal levers, to suit the driver's convenience. The right large pedal is pushed forward to apply the brake shoes to the larger, ordinary brake drums on the rear wheel hubs. The left large pedal is pushed forward to disengage the clutch. A horizontal accelerator pedal is placed between the large pedals and a plunger pedal opens the muffler cut-out valve.

There is a vertical air pump on the front board, hand-operated to force air into the gasoline tank, and a small gauge is placed on the front board to show the gasoline tank pressure. The front board also carries two carburetor adjusting linkages, one for adjusting the needle lift by the air valve and one to work a butterfly throttle valve in the carburetor auxiliary air valve air intake passage. The coil box occupies the usual position on the front board.

ON THE ROAD.

On April 18, 1909, the veteran American Simplex 7-passenger car already mentioned as having covered 50,000 miles without replacements other than brake facings, started in the morning, driven by D. A. Shaw, president of the American Simplex Company, and the writer, as observer, to make a 100-mile, measured-fuel run, but the engine began misfiring very soon, showed no power and could hardly make 20 miles an hour, and the run was abandoned for the day. The trouble proved to be in the insulation of the twoyear-old wiring, which yet looked good but was found on close examination to be all gone, full of cracks and current leaks which opened as soon as the car was driven hard. Besides bad insulation, the

gasoline supply pipe to the carburetor was found to be fumed inside, so that the motor was starved for fuel.

April 25, gasoline pipe clean and new wiring, no other changes, the veteran car left the Mishawaka shops, L. F. Maurer, chief draftsman, driving, President Shaw and three other passengers in the tonneau, and was driven to the Oliver House, South Bend, in 18 minutes, where the writer was taken aboard as front-seat observer, 6 passengers all told, and the car was headed for Michigan City at 3.07 P. M.

The Simplex was lively as a cricket, the day was cool but brilliant, small new leaves and pink buds were on the trees. and the big Simplex was more than willing to run fast. The road was clay, rough and bumpy and rutted, with some mud holes, to Laporte, 36 miles from the starting point, but Maurer can pick a road, and the big tires of the Simplex made smooth work of the rough side-roads, the main track being far too bumpy for our pace, which was from 40 to 60 miles. The Simplex rides very easy indeed with no noise and no vibration of the footboard at all, but the tonneau got a good tossing over the bumps. As we were entering Laporte we had a left driver puncture and stopped from 3.54 to 4.28 to replace the inner tube; and again in Laporte at a garage to make the new tire valve tight.

On the return we dropped two passengers, leaving only four aboard for the rest of the run. The car flew like a bird to 8 miles west of Michigan City, when the motor suddenly went hot, and we stopped at 5.20 P. M. for water; the radiator was

found nearly full, but everything was loose forward and the radiator stay-rod had interfered with the fan vanes and stopped the fan. Supplies were on board, and everything was made right and tight before we started at 5.39, and from that time on we ran non-stop, to 9½ miles west of Michigan City, save for one stop of 2 minutes to pick the broken glass out of the glass shield top-frame, and another stop at the Oliver House, South Bend, then to the shops at Mishawaka at 6.34 P. M. where it took 10½ gallons of gasoline to fill the tank full.

The whole distance covered was about 113 miles. The time was 209 minutes running time for about 113 miles travel, much over half the road being very rough clay. From Laporte to the end of the white road, about 21½ miles, the road is very good and most of this 43 miles was made at from 50 to 60 miles, 55 being common. The remainder of the road was rough. One severe bump shattered the top glass of the shield, and our tail lamp jumped off somewhere on the road so that we lost our rearend luminary.

The weight of this 7-passenger touring car without passengers is 3740 pounds. In this run we had six passengers to Laporte. 36 miles, and four passengers all through. an average total weight of about 4400 pounds, average speed 32 7-10 miles, 113 miles with 10½ gallons of gasoline, 10.76 miles to the gallon at nearly 33 miles per hour, much more than half the way on rough roads, this time and the per gallon mileage being both very good.

PRICE OF CAMERON CARS INCREASED

The Cameron Motor Co., of New York City, distributors of the 4 and 6-cylinder cameron air-cooled cars, manufactured in Beverly, Mass., and New London, Conn., advise us that the prices of the 3 and 4-cylinder models have advanced as follows: Model 14 runabout, \$900 to \$950; Model 14, 3-passenger roadster, \$950 to \$985, and Model 16 4-passenger roadster, \$1050 to \$1100.

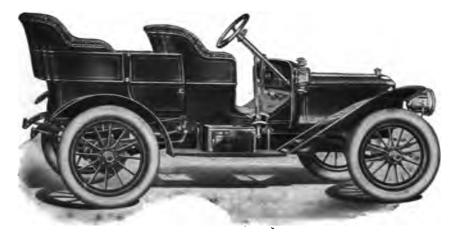
Something new in the line of hoods which seems likely to become popular has been built for George H. Bressette, of the Susquehanna Coal Company, by the American Locomotive Company, Mr. Bressette was buying an Alco tourabout and said that the ordinary hood did not sufficiently shut out the sky and sun. He wanted one with such a rake in front as to meet the sky line, so that he would have no sun in his eyes and be able to sit at the wheel and see the road only. It was a difficult task, but a hood of this sort was designed

for him and it proved to be so "classy" in appearance as well as serviceable that it excites general admiration. The whole trick consists in giving the forward part a sharper downward slope, but it makes a considerable difference to the eye.

The Pennsylvania Motor Association beld its annual meeting at Wilkes-Barre, Pa., on April 23. Secretary Wolf reported an increase of five clubs and 800 members during the year. The officers elected were as follows:

President R. P. Hooper, Philadelphia; first vice president, P. A. Meixell, Wilkes-Barre; John A. Wilson, Franklin, second vice president; Paul A. Wolff, Pittsburg, third vice president; secretary, Joseph A. Weeks, of Philadelphia; chairman of Good Roads, S. Boyer Davis, Philadelphia; chairman Legislative Committee, John A. Wilson, Franklin; Edward Kneeland, Pittsburg; Jacob E. Rider, Lancaster; J. F. McGourthy, Wilkinsburg; J. Henry Beck, Philadelphia, directors.

Here is the \$1500 Car That Looks Twice That



And it's as good as it looks.

It is the Mitchell "30," five-passenger touring car.

Compare it with any other four-cylinder, five-passenger car made in this country. No matter what claims may be made for them, or what price is put upon them.

It's a car that immediately catches the eye.

Nothing stingy in its appearance, because there's nothing skimped about it.

No economies have been made at the expense of the owner's comfort and pleasure.

It's roomy. Handsomely upholstered. Has a long wheel hase, big wheels and big tires.

It has the high-priced finish—the high-priced look, in fact.

But the astounding popularity of this car is based on something more substantial than its pleasing appearance.

Based on what it really is, and what it will do.

Based on the reputation given it by owners—men who have been driving Mitchell cars for years.

If you know a man who owns a Mitchell you can stop reading this advertisement right here—and go to him.

He will tell you that it is a good car in every respect; a car that you may be proud of as we are proud of it; a car that will take you any place and over any roads.

Its 4 cylinders are cast separate. It has 30 horse-power.

The wheel base is 105 inches. The 32-inch wheels are fitted with detachable rims and four-inch tires.

We give you a double ignition system on this car—the usual dry cell battery and a \$150 magneto. You are guaranteed against all ignition troubles.

The selective sliding gear transmission and the lubricating system and control are the best to be found on any car, no matter what it costs.

We use vanadium or nickel steel wherever necessary — and aluminum castings wherever possible, strengthening them with phosphor bronze where there is extra wear and strain.

We pump just twice as much water through the water jackets, per minute, as any other car, keeping the engine always cool.

And as with the water pump, so with the transmission, the clutch, the rear axle, the brakes, so with every part of the Mitchell car.

The "30" is the ideal general purpose car. It is built for country roads and for eight years has withstood the severest strain these roads could ever cause.

Again we say ask Mitchell owners anywhere—everywhere—and then you will know why the Mitchell factory is all sold up for the season, and why Mitchell agents are kept busy demonstrating and closing deals.

To-day's Mitchell cars—the 20, the 30 and the 48—embody the best that we have learned in designing, building and trying out \$11,000,000 of motor cars.

Shall we send you our catalogue?

MITCHELL MOTOR CAR CO.

508 Mitchell St., Racine, Wis.

STANDARD MANUFACTURERS A. M. C. M. A.

European Branch: No. 20, Rue de Tilsitt, Paris, France

The Lane 1909 Cars

Lane Sales Company, 2637-39 Broadway, New York, factory at Poughkeepsie, N. Y., located in its own building, Broadway and 100th street, New York City, had its first steam car on the road in the summer of 1900 and sold five cars that year. The sales of Lane steam cars have each year P. compound or 75 H. P. simple, steam 300 lbs., two revs. of crank-shaft to one of balance-gear drum. The weight with tanks filled is 3400 lbs. Price \$3100.00 including all accessories, 6 lamps, mats, horn and tools, ready for the road. Cape tops from \$100 to \$150 extra.

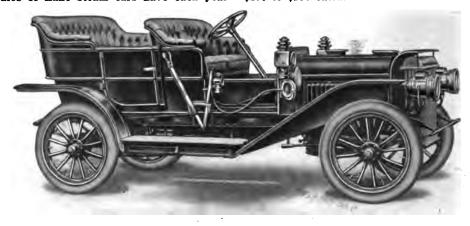


Fig. 1. Lane 1909 5-passenger touring car, 20 H. P., wheel base 103 ins., gauge 56 ins., tires all 32x4 ins. Motor, two double-acting cylinders, compound or simple, nominal 20 H. P. compound or 50 H. P. simple. Weight 2400 bs. Price \$2000.00. Equipment including accessories, 6 lamps, mats, horn and tools. The Lane Company offers five models of body for 1909. The other two models are a runabout body on the 30 H. P. chassis at \$2300.00. Each of these Lane runabout bodies seats three passengers.

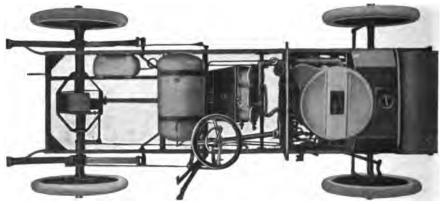
since more than doubled those of the year immediately preceding, 89 of these steam cars were sold in 1908 and the Lane Sales Company expects to place about 150 of these steam cars during the season of 1909.

BRIEF SPECIFICATIONS OF THE MODELS.

The 7-passenger 30 H. P. touring car has a wheel base of 119 ins., gauge 56 ins. The

THE BOILER.

The Lane 1909 "Close coupled" 30 H. P. touring car has the same chassis specifications as the 7 passenger car save wheel base and tires. The wheel base of this "Close Coupled" car is 125 ins., and the tires are all 36x4 ins. "Close coupled" refers to close placing of seats and rear seat



. Fig. 2. Lane chassis plan, showing the general arrangement, condenser in front, water tank next, then boiler, close in front of front board, motors inclined to rear in rear of front board and fuel tank under the driver's seat; the drive is chain to the bevel balance gear and divided rear axies.

tires are 36x4 ins. front, 36x4½ ins. rear. Motor, compound or simple, two double-acting steam-cylinders, 3% ins. and 6½ ins. respective diameters x 4 ins. piston stroke. Chain to divided rear axles, with bevel balance gear and driving wheels fixed to the rear axle ends. The motor is 30 H.

width only, this car seating four passengers. The car weighs 3300 lbs., price \$3000.00 including same equipment as seven passenger car. The spare tires are carried in the rear.

The 5-passenger touring car 20 H. P. has 103 inches wheel base, gauge 56 inches,

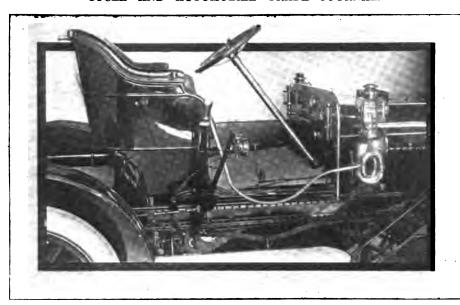


Fig. 3. Lane foot-board and control, floor boards and auxiliary control corer in place. See "Control." The steering is by exterior and interior screws, right and left thread. The sixth lamp is shown about the middle of this picture, so placed as to filuminate the gauge dials on the front to bord rear face.

tires all 32x4 inches. This car complete weighs 2400 lbs. and sells for \$2000.

The Lane boiler has always been a vertical, fire-tube construction, fire-tube carried directly up through the steam-space and have always had steel shells. The tubes have been subject to change as to



Fig. 4. Lane 1909 Boller. The seamless drawn steel shell, lower tube sheet integral with shell, shell and tubesheet both ¼ in. thickness, is made in two diameters. 20 and 24 ins. x 16 ins. long. The vertical fire tubes 1 in. out. dia., 1-18 in. walls, are electrically wedded into the lower tube sheets and expanded into the cupped top heads fixed to the shells by ¾ in. dia. rivets. The boller shells are covered with asbestos. The water supply is by a plunger pump to a continuous coil of ¼ in. out. dia. brass tubing, lower end opening to brase cylinder in which the water whirls before being discharged into the boiler. all sediment being deposited in granular form on the lower tube sheet whence it may be removed by blowing off. The 20 in. dia. shell has 192 of the same tubes. These Lane boilers with fire tubes electrically welded into the lower tube sheets can be heated red hot for 5 ins. at lower end without causing boiler leaks. The great length of water pipe coiled in the up-take absorbs the heat from the large diameter tubes, while the large tube diameter permits fuel combustion to proceed within the tubes themselves. Gasoline is the only fuel used.

both diameter and material; the Lane boilers are now made in two diameters, 20 and 24 ins., each 16 ins. long, shells 1/4 in. thick, drawn, seamless, lower tube sheet integral with shell, all tubes 1 in. out. dia., 1-16 in. tube wall thickness, top tube sheet cup-ped down and held with % in diameter The fire tubes are electrically welded into the lower tube-sheet and expanded in the upper sheet. All Lane boilers are tested to 1600 lbs. cold water pressure and are fitted with spring-loaded safety valves to blow off at 500 lbs. Lane boilers are fitted with feed water heating coils of % in. brass tube, 1/2 in. out. dia., placed in the up-take over the boiler. The fuel used is gasoline, vaporized over the burners, admission of combustible vapor to the burner tubes regulated by the steam pressure. The Lane motors are all 2-cylinders, compound, double acting, all naked cylinders, link valve-motion, two sizes, rated at 20 and 30 H. P. The engines are fitted with vertical condensers in front and the cars make about four miles to the gallon of water and from 7 to 10 miles per gallon of gasoline burned, according to car-weights, which run from 2250 to 3400 lbs. all on. It will be noted that the gasoline consumption is very little, if any, greater than that of 6-cylinder gas-engine driven cars, same weights.

The company will offer for the season of 1909 two different chassis models, 20 and 30 H. P. motors, fitted with five different bodies, with seats for from 3 to 7 passengers. The 30 H. P. chassis is made in three different lengths of wheel base, and the 20 H. P. in two lengths.

NOTABLE FEATURES.

The boiler lower tube-sheet, integral with the drawn-steel boiler-shell has the 1 inch dia. steel tubes electrically welded into it, so that the whole lower end of the boiler can be heated red hot without causing tube and sheet leaks.

The engine cross-heads are on one ball on each side, the eccentrics are on ball-bearings, the connecting rods are fitted with roller bearings at the wrist ends and the crank-shaft is in roller bearings. A pump plunger is fixed to each cross-head, giving two plunger pumps, one for the water boiler-feed and one for the air-pressure in the gasoline tank. The engines are set at about 30 degrees angle, crank-

THE BURNER.

The Lane burner is open 1/2 inch between the 3/2 inch diameter burner tubes, so as to ensure a sufficient supply of oxygen for complete combustion, and the 21/2 ins. diamixing tube is carried 3 ins. outside of the burner casing so as to cool the mixture enough to prevent firing back into the burner and mixing tubes. The blow-out of the burner flame is prevented by reducing the burner mixing tube to 11/2 ins. inside diameter and by fitting a cowl closed on the

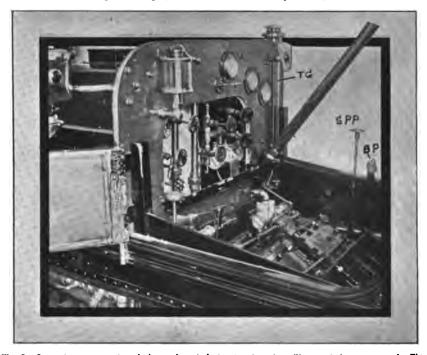


Fig. 5. Lane steam car, motor placing and control, foot-boards and auxiliary control cover removed. The illustration shows the inclined motor cylinders, the independent steam water pump and the hand water pump, last resort for boiler water supplying. The hand cylinder and steam pump oiler, a giass cup with a hand force pump is shown at the upper left of the front board rear face. Next to the right is the dial indicator which shows the boiler water level. The next dial shows the air pressure in the gasoline tank, and the third dial is the steam gauge. The glass tube at the right, TG, shows the water level in the water tank. The auxiliary control cover, when removed, disclosers 8 handles, top left handle opens the hand oil pump to the independent steam water and air pump steam cylinders, the top row middle handle works the compressed air valve to either send air to the gasoline tank or to the tire infating tube, or to open air if tire infating lose is removed. The right hand top valve is the steam pump steam admission. The left handle in the middle row opens the oil lead from the hand pump to the motor steam chest. The middle handle controls the stop valve in the line from the motor driven air pump to the gasoline tank. The right handle in the low line opens steam to the steam water pump. The fusible plug screw T-handle is seen at the left of the front board auxiliary control opening. The metal wheel just below works the stop valve between the fusible plug and the steam boiler. SPP, is a plunger pedal which is depressed to change the motor from compound to simple. BP is the ordinary brake pedal.

shaft low, giving an oil-basin for splash lubrication, ordinary cylinder lubrication by oil drawn in on the piston rod, with an emergency special oiling assembly which oils the motor cylinder and the independent steam-pump cylinders, two independent steam-pumps, one for water boilerfeed and one for gasoline-tank air-pressure, being fitted. The drive is by chain from the crank-shaft to the rear axle bevel-balance-gear.

There are brake drums on each rear wheel and the bevel-balance gear drum is used for the ordinary brake. The front wheels are on Timken rollers and the live rear axles are on Lane roller bearings. The rear wheels are fixed to the tapered live axle ends with keys and hex nuts.

top, bottom, front and outside, air taken in at the rear of the cowl, which acts both as a wind-shield and mud-guard.

The Lane condenser is five vertical rows of flattened brass tubes opening into a top header to which the exhaust is piped, and to an unobstructed base cavity which is piped to the top of the water tank. The discharge of this condenser to the water tank is intermittent, about the base cavity content, a quart or so, at each discharge. This condenser piping avoids a water pump between the condenser and the water tank though the bottom of the condenser is about 30 ins. below the tank top.

THE AXLES.

The front axle is a straight steel tube, with drop-forged steel axle yokes, slipped

in the axle tube ends and pinned and brazed, same as the steel casting spring perches are fixed to front axle. The front wheels are on Timken rollers, adjustable. The parallel steering rod is in the rear of the front axle. The stub-axle steering arms are 6½ ins. radius, with substantial rod connections.

The rear axle is also a Lane design and construction. This rear axle is built up of steel tube and steel plate 3½x½ ins. formed in an irregular octagon to take the bevel balance gear drum and sprocket. The driving chain is 1 inch pitch, % inch rollers for 20 H. P. and % in. rollers for 30 H. P.

BRAKES.

The rear-hub brake drums are, 20 H. P. chassis 8x1½ ins. external bands, vulcanized-fiber faced. The balance drum ordinary brake is 10x2½ ins., external band, vulcanized-fiber faced. The 30 H. P. brake drums on the rear wheels are 10x2 ins., exterior bands, vulcanized-fiber faced. The balance gear brake drum is 12x3 ins. exterior band, vulcanized-fiber lined.

The gasoline tank is of galvanized steel, cylindrical, oval ends, 17 gallons capacity for the 20 H. P. and 22 gallons for the 30 H. P. motor, and the tank carrying 60 lbs. air pressure on top of the gasoline.

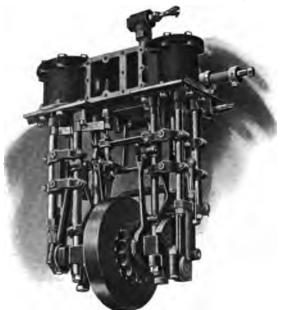


Fig. 6. The Lane 1909 compound double-acting steam car motors. These are plain slide-valve engines, link valve motion, two eccentrics for each valve, with a plunger-pedal operated linkage which makes the engines work simple instead of compound. The cross-heads have one traveling steel ball on each side. The inner ends of the rods are plain bearings, wrist ends of rods have roller bearings, eccentric yokes have ball-bearings and the crank-shaft is in roller bearings. The motors are two sizes, nominally 20 and 30 H. P. maximum when working compound and 50 and 75 H. P. when working simple. The motor cylinder diameters and piston strokes are, for the 30 H. P. motor, cyl. bores 3% ins. and 6% ins. x 4 ins. piston stroke; for the 20 H. P. motor, cylinders 3% ina and 5% in. bore x 3% in. piston stroke. The wrist ends of the rods are capped. The 30 H. P. motor weighs 180 lbs. The normal steam pressure is 300 lbs. The tumbling shaft is rocked by a latched hand-lever, placed outside at the right of driver's seat.

The 20 H. P. chassis front springs are 37 ins., long by 2 ins. wide, five leaves, tongued and grooved, top 4 leaves banded together, springs jointed to chassis frame eyes in front and linked in rear. The rear springs are 47 ins. long by 2 ins. wide, six leaves, tongued and grooved, top 3 leaves banded together, rear spring perches fixed to the rear axle, rear springs jointed to chassis frame eyes in rear and linked to chassis frame brackets in front.

The 30 H. P. springs, same general construction and placing as the 20 H. P., are 41½ ins. long front, by 2 ins. wide, 7 leaves tongued and grooved, top 4 leaves banded together. The rear springs are 50 ins. long by 2 ins. wide, 7 leaves, tongued and grooved, top 4 leaves banded together, rear perches fixed to axle tubes, springs jointed to chassis frame in rear and linked to frame brackets in front.

WATER TANK.

This is of heavy copper, is placed between the condenser and the boiler, and is piped to the motor water-force-pump, the water steam-pump and the water hand pump. The condenser discharge pipe opens near the top of the water tank interior, and a water over-flow pipe, ¾ ins. below the condenser pipe top end affords a steam exit also.

THE BODIES.

The Lane bodies are aluminum, by the Springfield Metal Body Company, and have fine outlines, as shown by the illustrations. The painting and upholstering are of the best throughout and the cars present s very fine apparance indeed.

The auxiliary control is by 8 handles covered as shown in Fig. 3, and exposed by removal of cover as shown in Fig. 5. It should be clearly understood by the reader

that this auxiliary control system has nothing to do with the regular control of the car, as handled by the driver when running on the road, but simply controls the auxiliary pump driving and oiling, supplying steam-driven water and air pumps and directing the hand pump oil supply. The emergency water and air pumping, when required, is done by independent steam pumps, the air pump being available for both tank pressure and tire inflating, so that the owner who drives his own car is relieved from all pump work as well as from starting crank hard and dangerous labor.

Outside of the emergency control the Lane steam car driving is extremely simple, and the entire control, both ordinary and auxiliary, is so obvious that it can be learned by anyone with a half hour's attention

CONTROL SYSTEM.

To raise steam, the air down-draft damper on top of the hood is opened to permit a free passage of air to the burner; next a door in the side of the hood at the bottom



Fig. 7. Lane crank-shaft. The entire assembly here shown is integral, machined from a single piece of steel and finished by case-hardening and grinding. The crank-shaft roller bearings are made in halves. The 20 H. P. crank-shaft diameters are: Journals 1½ ins., wrists 1 in. dia. For the 30 H. P. the corresponding diameters are: 1½ in. journals and 1½ in. crank-wrists.

of the boiler is opened, giving access to the "heater-cup" into which about a fluid ounce of alcohol is poured, this going to a horizontal pipe, perforated and asbestos clothed, placed below the gasoline vaporizing tube; next the asbestos pipe clothing alcohol wick is lighted, and then a hand needle valve between the vaporizer and the burner middle-mixing tube is opened, to permit the gasoline vapor injection to the burner main middle tube. As soon as the gasoline vapor begins to escape from the small holes in the tops of the burner tubes it is fired by the flame of the heating tube and everything is left as it is until the steam gauge shows, say 300 lbs., and the car is ready to run. Raising steam usually takes about ten minutes.

Before beginning to raise steam the driver tries the gauge cock screwed directly into the boiler shell; if no water shows at the gauge the hand force-pump is worked to fill the boiler to the gauge from the water tank. There are 3 gauge cocks; water at the lower cock shows enough to raise steam.

As soon as steam is raised the top airdamper is closed and steam is turned on to the forced-draught ejector, which sucks air up through the burner and boiler flues and then forces the product of combustion down to the open lower end of the vertical down-draft tube, which is about 5 ins. diameter and extends downward about to the bottom of the burner.

The motor can be started by moving the ratchet-retained hand-lever on top of the steering wheel, as soon as there is steam pressure enough in the boiler, and after the engine begins working the water-level and fuel-supply are automatically controlled.

The water-by-pass is controlled by two horizontal brass tubes on top of the hood and fixed to the front side of the front board governs the admission of water to the boiler by the expansion of the brass tube lengths, the boiler water supply water force pump always works and the brass tube expansion and contraction closes or opens the by-pass to give the boiler more or less water.

There are two vertical levers; the outside one, latched, is pushed forward to apply the external rear hub drum brake bands through a full-length evener. The inside hand-lever, latched, works the tumbling-shaft to make the link valve motion give an earlier or later cut-off, and the reverse, these functions corresponding to the sliding-gear speed-change lever of gas-engine driven cars. The forced-draft steamvalve is opened and closed by a small Thandle on top of the steering wheel. There is one pedal on the foot board, which is pushed forward to apply the balance gear drum brake-band, ordinary brake. plunger pedal at the left of the steering column is depressed to change the engine from compound to simple, the engine returning to compound as soon as this plunger pedal is released. The stop-valve between the boiler and throttle is opened and closed by a wooden hand wheel at the front left of the foot-board. A small handle in the middle of the front-board rear face controls the boiler water supply independently. A long vertical glass tube at the right of the front board shows the water-tank water-level.

The large, hand-worked-plunger glass-oilcup at the top left of the front-board, supplies lubricating oil to the two independent steam pumps.

The condenser is 5 rows of flattened brass tubes, vertical, 24½ ins. tube length between header flanges, top header and the hollow base, 27 ins. long, condenser tube assembly thickness about 5½ ins. The top header takes the exhaust, and the hollow base is piped to the top inside of the water tank.

The annual hill climb of the Worcester (Mass.) Automobile Club will be held on the 12th of this month on the Dead Horse hill course.

10,000 MILES Without Hitch, Waver or Trouble

Other Widely Advertised "Speed Indicators" Used on the SAME CAR so Inaccurate and Unreliable as to be Worse Than Useless, Broken and Replaced Many Times.

Proof Beyond Dispute That The WARNER

Auto-Meter

Is Alone Worthy a Place on Every Automobile

The whole story is in the extract from a letter from our Boston Branch House Manager:

"About the severest test to which the 1909 Warner Auto-Meter has yet been put was completed when the Maxwell car finished its 10,000 mile non-stop run here today. A Model M Auto-Meter was attached to this car at the start, March 18th.

"A — was attached to the left-hand side. The — broke the first day, and a new instrument was put on. I understand that three different—were put on in all, and there were four breaks when almost 8,000 miles had been run off. Then the mileage record shown on the — was about 1,500. At the conclusion of the run there was no flexible shaft on the — at all.

"The official mileage on the Warner at the end was 10,074.4, and the instrument was then running as well as at any time. The flexible shaft ran throughout without a whimper.

"I submit that this is going some. Yours truly, BROWN."

Can you, after such a convincing test, under identical conditions, specify or use anything but the accurate, sturdy and dependable AUTO-METER on your car?

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Pike St.: Denver, 1513 Broadway; Cincinnati, 122 East 7th St.



Indicator

Moline Model "M"

Moline Motor Car Co., of East Moline, Ill. recognizing the demand in many parts of the United States for cars of exceptional road clearance have met this requirement in their new 1909 model "M." The power plant of this car consists of a 4-cylinder motor 3% bore and 4½ stroke with thermal water circulation. In the plan view Fig. 2 is shown the general arrangement. The drive is to a counter shaft and through side chains to the rear wheels, thus doing away with the differential case at the center of the rear axle and allowing a very high road clearance. If

ing what might be termed a family or utility model. The growing demand for a moderate price car, especially for farmers, caused its inception and its construction throughout is provided particularly to meet the unfavorable road and other conditions to which such a car is necessarily subject. Large wheels and tires are also features which make possible the necessary road clearance as clearly shown in Fig. 1, a rear view.

The engine details and other features of this car were described in the February 1909 issue of the Journal, page 152, and



Fig. 1. Rear view of the 1909 Moline Model "M" showing the exceptionally large road clearance of this car mach is designed especially for use in country districts but is, of course, equally serviceable on the smoothest macadam. This car has 14 in. clearance, even the fiveheel and sod pan do not project below the level of the front and rear axies. The wheels are 34 in. in diameter with 3½ in. tires which are unusually large for a car of this price, selling, fully equipped for \$1,500.

a car is intended for exclusive country driving as when used by those living in farming communities, large road clearance aside from general simplicity of construction is perhaps of the greatest importance. Simplicity in the power plant, ease of repairing, accessibility, sufficient power, flexibility of control and extra strong construction are also features which have been the aim of the designer in producing this 1909 model "M" Moline car. Another feature which recommends this model is the removable tonneau, this be-

will not be here taken up in detail. The side chain drive makes the use of a differential housing unnecessary and, atthough the rear axle proper is no further from the ground than in many cars, yet the axle clearance at the middle is full 14 in. In addition to this the lower edge of fly-wheel, including the mud pan, is arranged so that it does not extend below the level of the axles. Clearance at the center of the rear axle is the feature desired as this is the point which is likely to touch when traveling country roads.

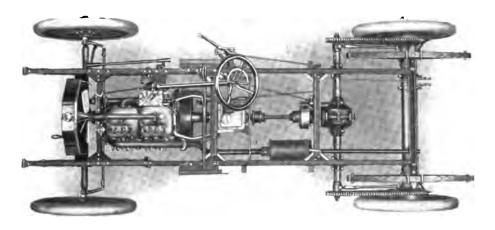


Fig. 2. Plan view of the chassis of the Model "M" Moline. The forward end of this machine is the same as the model K but the rear in order to gain the large road clearance is fitted with side chain drive from a countershaft carrying the differential. The wheel base is 107 ins., the motor 4 cylinders, 3% bore by 4% stroke. The chain sprockets being close to the wheels are raised by the wheels and do not touch.

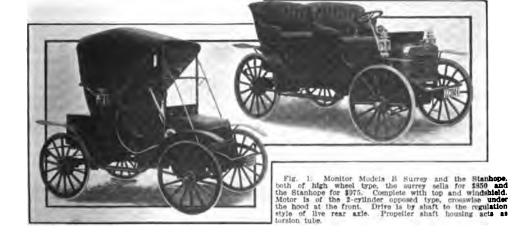
The transmission if of the vertical selective three speed and reverse sliding gear Ignition is by jump spark using quadruple coil and storage battery, 34 in. wheels fitted with 31/2 in. tires are used. The wheel base is 107 in. and the tread

standard. The equipment consists of two gas lamps, two side lamps, tail light, horn and complete kit of tools and the car sells for \$1500 thus fully equipped. The body, including the detachable tonneau, seats five passengers comfortably and full scroll end rear elliptic springs give the car exceptional riding qualities. If desired, an option is given of a bevel gear drive which cuts down the road clearance to 10 in.

Monitor Cars

The Monitor Automobile Works, of 1600 N. Halsted Street, Chicago, which concern has been for some time engaged in the building of buggy-type cars, as well as having done a small and conservative, though very successful, business with a heavy, seven-passenger touring car, have made several innovations in their line for 1909. The newest machine, on the design for which Mr. J. Frank Waters, general manager for the company, has been at work for some time, is a Model B No. 2 surrey, or, more properly, the chassis of this car, since it also is put out as a runabout and as a stanhope, the latter with a particularly neat panel body, top, and glass front.

These cars are driven by two cylinder horizontal opposed 18 H. P. Monarch mo-



tors, either air or water-cooled. With the air-cooled the cylinder dimensions are 5x 4½, while in the water-cooled the stroke is increased to 4¾ inches. The fly wheel fan, six bladed, takes care of the cooling of the unjacketed motor, while the water-cooled type is provided with a finned tube radiator in front. No pump is used, circulation being by thermo-syphon. The lubricator includes an oil reservoir built into the crank case, in the case of the water-cooled engines, while the air-cooled mochanical oiler, one lead to each of the cylinders and to each of the main bear-

The rear springs are of the full scroll elliptic type, the lower halves being shackled to the upper halves; each part has four leaves. The front springs are half-elliptic, with five leaves, and their rear ends attached to down shackles from the frame. The wheels are 36 inches, wood artillery, with 14 spokes and 1% inch solid rubber tires. The brakes are internal expanding in the rear hub drums, applied by a ratchet pedal, and compensated by a singletree device. The frame is of channel section, made by the A. O. Smith Co. The wheel base is 86 inches, and the tread 561/2 inches. steering is irreversible, by worm-andpinion.

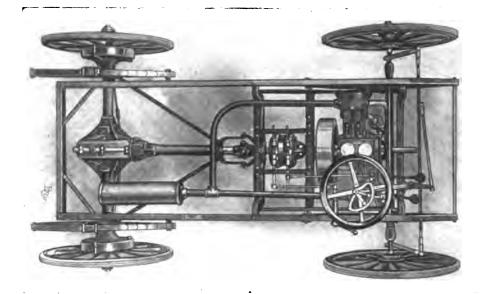


Fig. 2. The plan of the Monitor chassis showing the mounting of the two-cylinder opposed motor, planetary transmission and the arrangement of the shaft drive. The rear axic construction is such that the torsion arm is not needed, the frame is pressed steel of channel section. Full clipite springs are used at the rear.

ings. In some of the cars Davis motors are used, and it is not settled which type will be made permanent.

Ignition is high tension with Kingston double-vibrator coll. Spark and throttle levers are on stationary quadrant above steering wheel.

The gear set is of the planetary type, with two speeds forward controlled by a side lever and the reverse controlled by pedal.

The final drive is by propeller shaft and bevel gear drive to a live rear axle. The propeller shaft is completely protected by an enclosed tube, which also serves to meet torsional stresses doing away with a torsion arm. Ball bearings are used throughout the rear axle, and roller bearings are used on the propeller shaft. The front axle is tubular, with the drag link behind. The steering pivots are of the Elliott type, and the front wheels run on adjustable ball bearings.

The prices are \$850 for the surrey and \$800 for the runabout, with water-cooled motors, and \$50 less on each for the air-cooled motor. The stanhope sells for \$900.

Another car, made by the Monitor Automobile Works, is their Model L "Trouble Wagon." This vehicle is a power wagon for the use of telephone and electric light companies, being designed for quick traveling to a point where line and other repairs are required, and of a carrying capacity sufficient to transport men and materials necessary for the prompt rectifying of breakdowns. The load capacity is 1500 pounds, with body space 35x84 inches. The car is propelled by a two-cylinder opposed motor of 20 horsepower and is capable of a maximum speed of 25 miles an hour. The gasoline capacity is 12 gallons. The equipment is oil, tail, and side lamps, horns, and set of tools. The price with water-cooled motor is \$825, with air-cooled \$775.

5 5 5 5 5 5 5 5 5 5 5

Do You Know

of a mechanical or structural improvement in Automobile design and building that is not incorporated in

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The Hupmobile

The Hupp Motor Car Company, of Detroit, started delivering a light two-passenger runabout March 1st, and are scheduled to ship 500 of the '09 model by August 1st. This racy little car is of original design throughout, but along what is generally conceded to be up-to-date construction.

The company are confining their efforts to the production of the one model. The wheel base is 86 inches, standard tread and 30 x 3-in. G & J tires. The car is hung low, but has 11-in. road clearance under the axles, and 13-in. under the fly-wheel. All cars are finished in a pleasing red, with black mouldings and hair stripes. The upholstering is plain black, machined buffed

shaft has a %-in. offset from the centre of the cylinders. The forward end is tapered to carry a 40-lb. helical bladed 14-in. fiywheel that is clamped on a taper by a twojaw hardened starting crank nut. The starting crank is journaled in a casting bolted to the front cross member of the frame and is held out of engagement by a helical spring. The drop-forged connecting rods are two bolt, Parson's bronze bushed, scraped to a bearing, with oil scoops in the caps. The bone-hardened and ground piston pins are a drive fit in rods locked by cone pointed set screws and bear in the ristons. The pistons are 3% in. long, ground, taper with an oil groove % in. wide

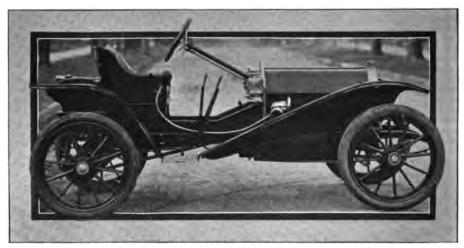


Fig. 1. View of the new Hupmobile. A natty two-passenger runabout with a four-cylinder, 3½ bore by 3½ stroke, rated at 16-20 H. P. Crank shaft off-set % in., fly wheel with fan blades at the forward end, allding change spend gear clutch, and engine forming a unit assembly mounted on pressed steel cross girts, a transverse rear spring and semi-elliptic front springs are used, giving the frame a three point suppension, the rear point being of ball and socket type. There are several special constructions aside from the springs which are dealt with in the text, under "Rear Axle Assembly." "Unique Oiling System," "Radiator Steam Prevention." etc. This car with complete equipment sells for \$750.

leather and padded to support the lower back, leaving the shoulders free. The cushions are $4\frac{1}{2}$ in. at front and 3 in. at the rear. Plenty of leg room is allowed, as there is 28 in. from seat to dash.

The 15-in. steering wheel and dash are mahogany finished. The hood is three-hinged, 30 in. long, clamped in place by four-lever hold-down clips that slide in metal bushing in the hood strips. A polished aluminum ledge supports the hood at the dash.

An 11-gallon gasoline tank is carried on the deck at the rear of the seats at a height that insures plenty of gasoline on all hills.

The car complete weighs 1100 pounds, is capable of 50 miles per hour and sells for \$750. This price includes oil lamps, tools, and full equipment for the road.

THE POWER PLANT.
The four-cylinder motor, 3½ bore by 3%in. stroke, is rated at 16-20 H. P. The 1½in. diameter, 30-point carbon steel crank-

for the lubrication of the piston pins. Three eccentric bevel split packing rings are used, made of special analysis, hard, close grain iron ground on three faces.

The valves are 11/2 in. in diameter, 45 degree seat, carbon stems electrically welded to nickel steel heads and ground all over. All valves are on the left side with spark plugs over the inlets and priming cups over the exhaust valves. Inlet and exhaust headers are of cast iron held with four clamps and packed with copper asbestos gaskets and centering rings. The inlet header has a chamber that extends from the lower air inlet of the Breeze carburetor up to the exhaust header, preventing condensation and delivering warm air around the spray nozzle. A one-inch pipe plug can be removed from the lower part of the hot air duct, allowing a direct air inlet to the carburetor for summer use.

CAM SHAFT AND CAMS.

A one-piece, drop-forged, bone-hardened and ground cam shaft is babbitted in place

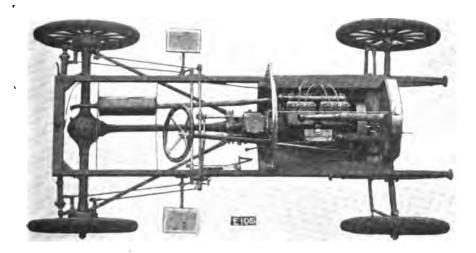


Fig. 2. Plan view of the Hupmobile showing the simplicity of the chassis arrangement. Motor, sliding change gear and cone clutch form a unit incased in a gray iron housing supported on pressed steel, channel section, dropped cross girts. This spark is fixed, cooling is by thermo syphon circulation to a special steam proof radiator, four brakes, all of internal expanding, cam-actuated type are arranged side by side in the drums, one on each rear wheel. These are operated by pedal and hand lever. Note the well braced rear axle and propeller shaft housing or torsion tube assembly, also the rear cross frame member at the center of which the frame is supported on the cross spring by a ball joint. The wheel base is 86 in., tread standard tires 30 by 3, G & J, road clearance 11 in., 13 in. under the fly wheel.

in a cast iron side plate that extends the full length of the motor, and when removed gives free access to the connecting rods. This shaft has five bearings open to the splash of oil and as the babbitting in place makes a perfect alignment of these bearings, they should wear indefinitely without shake. The valve tappets also have their bearings in this plate. They are \$% in. in diameter, bone-hardened and ground. The cam contact end is milled on

a radius giving practically the same effect as a roller without the chance of lost motion. The tappets have grey fibre inserts where contact is made with the valve stems, insuring a quiet valve movement.

The cam-shaft gear is of grey non-swell fibre backed on the sides with steel, running with a crank-shaft and magneto gear of steel. The centres of the gears can be adjusted by varying the thickness of gasket used and thus a quiet gear can always be obtained.

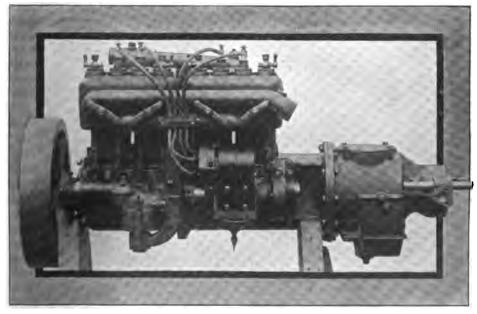


Fig. 2. Left side of Hupmobile unit power plant assembly. Fly which at the front with integral fan blade spokes. At the rear is shown the housing of the aliding change speed gears and the fibre lined cone clutch. This view shows the high tension Bosch magneto gear driven from the cam shaft, gears incased; compact wiring to the spark plugs; cast inlet and exhaust manifolds held by four yokes, stude and nuts.

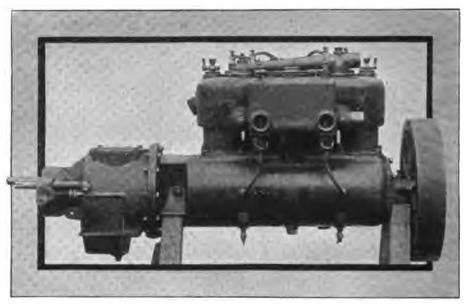


Fig. 4. Right side of the Hupmobile unit power plant. This side shows the tapered cast thermo syphon water pipe at the top and the oiling device cast integral with the inlet water header. The oil passages are connected with the throttle and operate in unison with it, thus supplying the motor with oil in proportion to the work being done, which is undoubtedly a correct principle. Oil is fed to the two crank case compartments, each of which is provided with overflow drain cocks. Arrangement is made for quickly flooding either compartment by simply lifting a plunger valve accessible from the top of the oil tank, obviating the necessity of pouring extra oil into the crank case.

TIMING THE MOTOR.

In timing a new motor, the side cover is bolted in place with the proper teeth in mesh, a clamp is put on where the magneto gear meshes, which holds the gear fixed in relation to the side cover; it is then unbolted and put in a timing jig on the bench and the cams ground with a small emery wheel to the correct opening and closing of the valves. It is then put back on the motor and clearance filed off the fibre tappets. This system has been found very rapid and accurate, as all slight errors in placing keyways and the warping and

twisting of the cam-shaft in hardening are eliminated.

THE IGNITION.

A high-tension Bosch magneto with fixed ignition is mounted on a ledge on the side cover and driven by a housed gear keyed on the armature shaft and meshing with the fibre cam-shaft gear. Five wires lead from the magneto, one to each spark plug, the other to a switch on the dash which is short-circuited to cut out ignition, and is the only operative device on the dash.

UNIQUE OILING SYSTEM.

ng keyways and the warping and drains. Oil pockets are provided over the Parson's bronze engine and transmission bearings with a return oil drain on the front fly-wheel journal. The two crank



Fig. 5. View of the applied cam shaft housing with its integral vaive lifting rod guides, magneto support and gear housing. This cam shaft is a one piece drop forging, case hardened and ground, the shaft runs in five babbit learnings and is babbited into position, giving it perfect alignment, the valve tappets are % in. in diameter, case hardened and ground, their lower ends being milled to a special radius, giving them the same lifting effect as rollers, cam shaft gear is a combination of gray non-swell fibre and steel which meshes with the steel crank shaft and magneto gears.

case compartments provided with level drain cocks, are fed by an oiler cast integral with the inlet water header. This oiler has two hollow cocks held to a seat at the lower end by springs. The upper ends of these cocks have small ball and socket levers coupled to the accelerator pedal that controls the carburetor, so when the throttle is wide open the oiler is also open, and when throttled down very little oil is fed, thus the oil is correctly fed in proportion to the work done. Either one of the engine compartments may be flooded by lifting these cocks from their seats, obviating the pouring of oil down the vent

satisfactory in France, where fixed magneto ignition is used on 44 per cent. of the cars, contributing more toward the life of an engine than fine workmanship and cuts out at one stroke the "bugaboo" of four-cylinder engine ignition.

CHANGE GEAR AND CLUTCE.

The transmission case of cast iron is bolted to the crank case and is of rigid construction. It also houses the self-adjusting fibre lined cone clutch that is thrown out of engagement by a pedal pivoted on the gear case. The sliding gear transmission has a low-speed ratio 2.7 to 1,

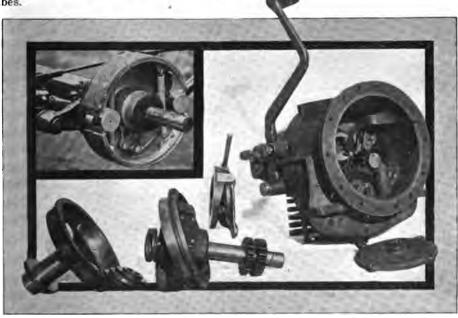


Fig. 6. Hupmobile change speed gear casing and fibre faced cone clutch. At the upper left is shown the twin woren wire asbestos lined expanding brakes, which act by means of cam rocker expanders against the inside of a single hub drum, the shoes are prevented from dragging when disengaged, by means of the springs which are shown.

RADIATOR STEAM PREVENTION.

The cooling system is thermo-syphon, holding less than a pail of water. The radiator has vertical tubes. The outlet from the motor enters a tank eight inches from the top of the radiator. This tank extends across and half-way through and is not visible from the front. The hot water entering this must pass upward through tubes four inches in length, which is sufficient to prevent steaming. Two studs in the bottom of the radiator fasten it to the front frame cross-member, while a tie rod braces it to dash at the top. One pet cock drains the entire water system.

FIXED SPARK.

The carburetor is controlled by an accelerator pedal and can be set by a hand lever under the steering wheel. There is no spark control as the magneto is set with a slight advance and generates a hotter spark at high engine speeds. This has been found

with a direct drive on high. The toggle operated reverse pinion has the same ratio as the low gear.

There is one neutral position of the side control from which any gear can be meshed. The movements are back for low. forward for high and to the side for reverse. The gears are of 20-point carbon steel, bone-hardened and drawn in oil. The tooth is a generated eight pitch, 10 depth, 20 per cent. involute of % and 11-16 in. face. The counter-shaft gears are riveted to a bronze hub that journals on a hardened and ground shaft. The hardened. splined transmission shaft also carries the clutch and has a bearing in the clutch drum at its forward end and the direct drive gear hub at the rear. The latter has a long Parson's bronze journal in the transmission case and is broached square to take the male end of the universal joint.

The rear end of the gear case has a large

cylindrical bearing that fits over the spherical universal housing of the propeller shaft, making a dust-proof joint and taking the torsion of the rear axle. Two ball end radius rods extend from the rear brake supports diagonally up to sockets in the transmission case, making a very flexible construction.

THE REAR AXLE ASSEMBLY.

The rear axle is of great strength, the 2½ in. by 7-32 in. walled steel tubing is pressed and riveted in a well-ribbed bevel gear housing, no truss rod being used. The axle shafts are 1½ in. diameter, of cold drawn piston rod steel journaled on Hyatt bearings at the wheels and large shim adjustment two-point ball bearings at the differential case and propeller shaft.



Fig. 7. Front and rear views of the Hupmoble. The front view clearly shows the neat radiator lines, arrangement of the webbed fenders dropped tubular front axie, steering plvots, etc. The steering cross link is to the rear of the front axie. The rear view shows the peculiarly mounted rear cross spring to the center of which the body is mounted on a ball joint and the outer ends of which are pivoted to sliding journals on the cross bar, which is parallel to the rear axie and supported by rearwardly extending arms from the brake supports. Each journal is flitted with a compression spring exerting outward pressure only, thus tending to increase slightly the deflection of the rear cross spring for downward movements of the body, but acting as a rebound check, when the spring recovers. The sliding journals are fitted with grease cups as shown.

The drive pinion and small bevel differential gears are of 31/2 per cent. nickel steel, bone-hardened; the large gears meshing with these are of 30-point carbon, bonehardened. The standard gears have 14 and 48-6 pitch, 20 per cent. generated tooth and a 12-tooth is furnished for extremely mountainous country. It is electrically welded to the propeller shaft, as it has been found impractical to successfully key a gear on of less than 14 teeth. The front axle has an angle drop from the axle ends, which are of forged steel brazed to 1% in. x 1/4 in. wall steel tubing. The drop-forged steering spindles are 1 3-16 in. dia., mounted with two point adjustable ball bearings.

BRAKES AND SPRINGS.

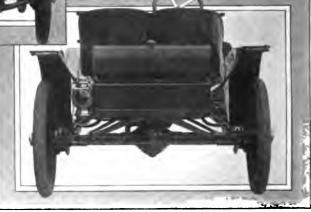
The four internal expanding cam actu-

ated brakes are lined with wire woven asbestos. Two are used side by side on each rear wheel and are interchangeable. A pedal operates one set and a hand lever the other.

The inverted double sweep rear cross spring has a ball socket clipped in the middle, taking a ball ended taper shank bolt that seats in a bracket in the middle of the rear cross frame channel member, giving the frame a three-point suspension.

The eyes of the spring are pivoted to sliding journals having a bearing on a cross bar parallel with the axle and supported by arms extending rearward from brake supports. Behind each journal is a compression spring that exerts a pressure outward, tending to deflect the cross spring and accelerate its deflection but retard the rebound. The front springs are semi-elliptic, 34 incnes long, hung with compression shackles at the rear.

The fact that the frame is mounted on a ball allows of a certain gravity swing that is, of course, no faster than can be followed by passengers in the car, so there is seldom a rebound of enough magnitude to lift the weight of a passenger from the cushion.



THE STEERING GEAR.

The enclosed steering gear is of the rack and pinion design, both gears bone-hardened. Contrary to most designs of this type, there is no bending movement in the rack, as it has a straight line connection with the axle steering arm by means of a drag link with heavy adjustable ball sockets at both ends. With this construction no movement of the steering wheel is perceptible when the springs are deflected. The steering gear housing is riveted to the front cross member. The steering wheel shaft bears in this and extends backward at a rakish slant to the aluminum spider of the steering wheel. A tube houses the steering shaft from the dash up to a terminal bearing that carries the hand throttle lever.



BY P. S. T.

The Buckeye Mfg. Co., Anderson, Ind., builders of Lambert friction drive cars, will produce two models for 1909. Of these cars the leader will be a four-cylinder touring car of 28-30 H. P., with 110-inch wheel base, at \$1250. The other car rated at 18-24 H. P., is fitted with a double cylinder, opposed engine across the front, has 94-inch wheel base, and will be sold for \$800.

THE FRICTION DRIVE.

In both cars the well-known Lambert friction change gear and single chain drive to sprocket gear on the live rear axle will be used. This change gear mechanism has proven such in the past that the makers are thoroughly satisfied with and will con-

tinue it with only such minor changes as make for use of operation and adjustment.

For the benefit of those few who are not thoroughly conversant with the change gear system it will be here briefly outlined, and, since the differences between the two designs lie only in sizes, due to the difference in H. P. transmitted and not in the forms of the parts, the same description applies equally to both: Power is transmitted from the engine fly-wheel through three studs set into its web to a three-armed spider, holes in the arms of which are bushed with hard fibre and provide a sliding fit on the studs. Keyed into the hub of the spider is a shaft connecting the engine with the driving friction

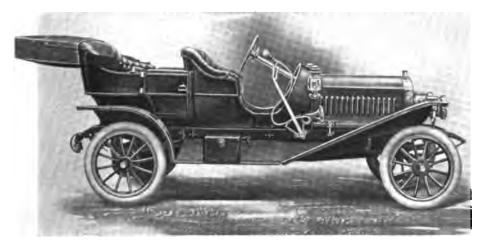


Fig. 1. Lambert Model "30" Touring Car. 4-cylinder Rutenber motor. 25-28 H. P., cylinders 4x4, friction transmission, jump spark ignition from storage battery. From the counter shaft the drive to the rear axie is by single silent chain inclosed in a dust proof metal case. Wheel base 110½ in., tread 56 in., clearance 10½ in., internal expanding brakes in each rear hub, tires 303½, quick detachable, weight 1700 lbs., equipment: two gas lamps, generator, tail lamp and two oil side lamps, 40 in. flexible tube horn, and full tool equipment, \$1,250 F. O. B. factory.

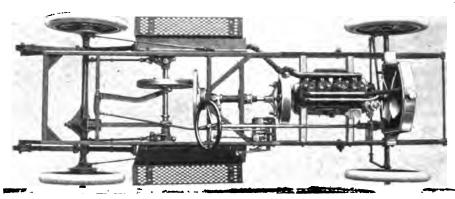


Fig. 2. Plan view of Lambert "30" chassis. This view shows the arrangement of the friction drive and the special diagonal braces supporting the friction disc which is of aluminum. A three pronged apider with ball and socket ends is interposed between the main shaft and the fig wheel. A silent chain transmits the power from the jack shaft to the rear axis.

disc. A sleeve, capable of being shifted endwise by a ratchet retained foot pedal, provides the rear journal of this shaft, which is so mounted within it that relative end motion is not permitted between the two. Since the aluminum-faced driving friction disc is keyed to the rear end of this shaft, it is seen that operation of the pedal moves the shaft and disc bodily toward or away from the driven disc, and thus provides a clutching or declutching action, as the case may be. Between the driving disc and the rear end of the rotating sliding journal box is placed a ball thrust bearing 17% inches diameter, com-

posed of 51 ½-inch balls operating between two hardened and ground steel discs. It will be noted that the stud drive at the fly-wheel leaves the engine crankshaft entirely free from end thrust, this being entirely absorbed in the large thrust bearing and pedal linkage.

The driving disc rotates with the engine shaft in a vertical plane transverse to the length of the car, and engages by the above mechanism, with the paper-built periphery of the driven disc of the same diameter and mounted on a shaft journaled across the car. The paper rim of the driven disc, together with the alum-



Fig. 3. Lambert Model B-2. 7-passenger touring car, large tonneau, extra seat when folded forms a foot rest, wheel base 108 ins., 32x4 in, quick detachable tires, 35-40 H. P. Rutenber motor; double ignition system with high tension magneto and storage battery, double set of plugs; flat tube radiator with fan; friction transmission with direct chains to each rear wheel; ratchet brake on jack ahaft, internal expanding brakes on rear hubs; angle steel frame; 2x3x½, 13 gallon gasoline tank, 4 gallons as an emergency supply; weight 2,700 lbs., equipment: cape extension top with full set of storm curtains, folding glass wind shield, two gas lamps with generator, two oil lamps, tail lamp, horn, foot rail, tool boxes on running boards and in rear, full equipment including jack, \$3000.

inum facing of the driving disc, affords as nearly positive engagement as may be had in this type of change gear.

The driven disc or wheel is feathered on four keys set into a large diameter tubular shaft carried at its outer ends on Hyatt rollers. Hyatt rollers are also used in the shifting journal just forward of the driver.

Toward the right of the centre of the car a spark pinion is mounted on this tubular shaft and drives the enclosed live.



Fig. 4. Flexible coupling used between fly wheel and driving shaft to friction disc, each of the three arms of the spider attached to three carbon steel studs from the fly wheel, each of which is fitted with a 1% in babbit ball split on one side as shown, each spider arm ends in a split half socket which fits over the babbit ball and have another threaded socket which when screwed into the end completes the joint and is brought together by a clamp bolt and lock nut. This arrangement gives a universal action between the motor and the friction disc, the device being adjustable for wear.

rear axle shaft through a spur differential by single chain. A long side lever, working over a ratchet quadrant, connects by link with a bell crank, one end of which is forked, and, engaging with a shifting ring in a groove in the bars of the driven wheel, serves to shift it toward or away from the centre of the driver, thus securing changes of speed and, when shifted across the centre of the driver, a change in rotative direction. Thus far the change gear is the same as that built for 1908.

REFINEMENTS FOR 1909.

For 1909 reference is made in several details: Wear of the paper rim of the driven wheel and chain stretch are now compensated for by one operation—screw adjustment which shifts the driven disc, its shaft and journals bodily forward with reference to the same side members. While this is a considerable advance over previously employed methods of adjustment, in which wear at each of these points were taken up individually, a still greater advance has been made in the substitution of a 1%-inch Reynold silent chain for the formerly used roller type chain.

The Reynold chains run on wide gears front and rear, the latter being flanged to prevent jumping. An ingenious and quickly detachable metal boot, leather lined to prevent rattling and noise, completely encloses gears and chain, making

adequate protection and lubrication possible.

NEW SPRING SUSPENSION.

A third change is in the direction of easier riding. To this end the shackles at the rear of the front springs have been done away with and in their places are now fitted large diameter helical springs. These springs act as shock absorbers and make the front suspension very flexible and easy. In the rear the springs are also changed. Here the rear half of the semielliptic spring is divided and secured by a simple system of double shackles, one of which is of the ordinary type, while the other is a helical spring under compression. The makers are satisfied that they have improved the riding qualities of their cars some 100 per cent. by these spring changes.

Frames are of pressed steel channel section strongly reinforced by cross-members of similar section. The great strength, maintenance of alignment and flexibility secured is well shown by the diagonal cross-bracing just forward of the driving discs, in the cuts herewith. The front wheels are mounted on Timken rollers in both cars, while the rear axle driving shafts are on Hyatt rollers, and are tapered and keyed into the rear wheel hubs.



Fig. 5. Silent Renold chain which drives to the rear axie. This chain is 1½ in. in width as used on the Model "30" and 2 in. on Model 19, shown in the headplece of this article. The chain is silent, eliminating one of the most objectionable features of the chain drive. The rear sprocket carries a double finaged wheel. This chain is encased in an oil tight and dust proof steel housing. The counter shaft gear is one inch wider than the chain, thus allowing the chain freedom for some side motion.

LARGE CAR POWER PLANT.

The larger car is equipped with a Rutenber four-cylinder engine, cylinders 4½ by 5 inches, and the control in this car is the same as in typical sliding gear cars. Steering by large hand wheel, above which are throttle and spark timing levers moving over a stationary quadrant, connected with a Barnes screw and nut gear; two pedals, the clutch a disc engaging pedal, and the service brake pedal, both held by ratchets, and the speed changing and emergency brake levers at the side of the car. In this car both the service and emergency

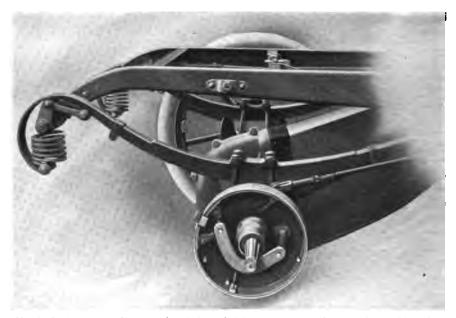


Fig. 6. Lambert rear spring suspension, brake and chain casing. The springs are of the triple action type, fitted with a supplementary coil and a scroll end, the combination acting as a shock absorber. The chain casing is of steel, very light and completely protects the silent chain at the same time providing ample lubrication for it.

brakes are on the rear wheel hubs, contracting band and expanding shoe, respectively.

The smaller car is powered by a double cylinder opposed Davis engine, cylinders 5 by 4 inches, all valves mechanically operated, and cylinders cooled by thermo syphon water circulation through a large radiator. This engine has lugs on the cylinder heads, whereby it is bolted directly to the main frame members.

CONTROL.

The control is by steering gear and the

engine control as on the larger car. A single side lever controls the speed changes, and clutch and brake pedals, the latter pedal operating expanding shoe brakes within the rear wheel hubs, control these members.

Either of these car chassis can be had equipped with any type of body desired; the prices above quoted are those for the five-passenger, open body, four-cylinder roadster, special bodies, tops or irregular equipment being charged for extra.

Although finality of design has not yet been reached, yet there are certain types of construction for standard touring cars which are accepted as good practice, and from these very few of the well known manufacturers of high grade cars have the temerity to deviate. This is probably due largely to the knowledge of the makers, born of past experience, that the average purchaser does not pass judgment on any particular method of con-struction, but is very apt to condemn as freakish, or as untried or experimental, any construction not shown by the majority of well known makers. For this reason many manufacturers hesitate to incorporate in their new models features which they themselves have sufficiently tested and feel confident are entirely satisfactory,

The Luverne Automobile Co., of Luverne, Minn., are now located in their new factory. They state that they are operating both their old and new factories to their full capacity, and that they are planning on further enlarging their plant.

The Columbus Automobile Club is to have a "Sign Raising Day." This is a suggestion for other clubs to consider, in localities where road information is scanty, if not utterly lacking. The Columbus Club has ordered 100 galvanized signs and they will be placed at important points on the favorite touring roads adjacent in the city within the next month.

At the annual meeting of the Louisville Automobile Club, of Louisvile, Ky., the following officers were elected: J. F. Ross, President; Dr. Henry E. Pulley, First Vice-President; Robert C. Morris, Second Vice-President; Eugene Straus, Secretary; Walter I. Kahn, Treasurer.

A special committee was appointed and the club decided to build a five or ten-mile race track the coming season and hope to have it ready for the annual fall racing.

H. A. Flagg, formerly Eastern salesman of Shelly Tube Co., is now connected with the Standard Welding Co., of Cleveland, as assistant to W. S. Gorton.





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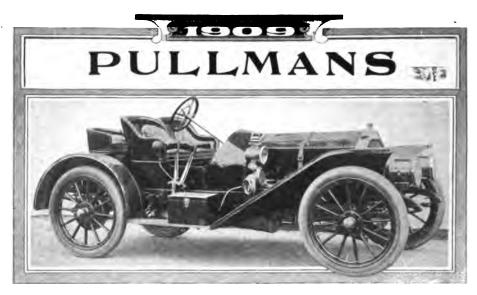
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THE HALL
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DETROIT MICH., U. S. A.



The York Motor Car Co., Inc., York, Pa., as in former years, are placing on the market for 1909 a complete line of cars from the two-passenger, 4 and 6-cylinder runabouts to the 7-passenger touring cars, including an entirely new 30 H. P., 5-passenger light touring car known as Type "K." These models range in price from the model "L" runabout which seats 3 passengers, has a 4-cylinder engine of 3% in sq., 20 H. P., at \$1500, up to the Model "M," 40 H. P., 7-passenger touring car which has a 4-cylinder engine of 5 x 5 ½ in. and sells for \$3500.

The new cars are but very slightly changed for 1909, the changes being simply refinements. The materials used in all the Pullman models are claimed to be the best and highest priced that can be procured.

MODEL L.

The Model "L" runabout has a 4-cylinder engine, 3% in. sq., 20 H. P., at 1000 R. P. M.

The body is wood and metal with a rumble seat as regular equipment, double bucket seats being supplied as an extra. seats are upholstered with French finished leather with soft edges and spring cushions in the seats and backs. The bodies are of Pullman red with red upholstery; special colors to order. The front axle is a drop forging of I-section and the rear is of the floating type, the car being shaft-driven; 32 x 3½ in. tires are used front and rear. and the wheels are mounted on Timken rollers. Lubrication is by a self-contained oiling system from the positive oil level controlled by valve adjustment, while the change gears, following customary practice, are packed with lubricant. Two sets of brakes are used, the emergency brake being on the transmission shaft and the internal expanding brakes on the rear wheels. The clutch is of the leather face cone type with cork inserts. This car weighs about 1750 lbs., has 102-in. wheel



Fig. 1. Pullman Model 6-30, 6-cylinder, 30 H. P., light speed car. This is a high speed runabout for 1909. Moden body and rumble seat. Engine. 3% x 3%, water-cooled, flat tubed radiator and centrifugal gear-driven pump. Boach high tension magneto with distributor, single coil and switch. New lubricating system, oil level controlled by valve adjustment. Tires, 34 x 3%. Cork inserted one clutch. Sliding gear, selective type, shaft drive, 104 in wheel base. Price, \$3,500, completely equipped and ready for the read.

base and 10-in. road clearance, and sells, completely equipped, including two acetylene headlights, two side oil behts, taillight, horn, tool kit and gas generator, for **\$1500.**

MODEL 6-30.

Model 6-30 is a 6-cylinder high speed runabout finished in French gray with red up101/4-in. road clearance, weighs about 2500 lbs. and is placed on the market, completely equipped, for \$3000.

SEVEN PASSENGER TOURING CAR.

The 7-passenger touring car has the same motor and general chassis arrangements, but has a wheel base of 119 in. and is fitted with a large side entrance tonneau of



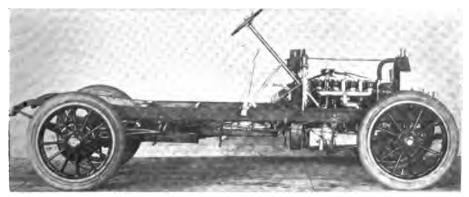
Fig. 2. Pullman Model M, limousine, 4-cylinder, 40 H. P.. cylinders cast separately, integral heads and water jackets, 5-in. bore, 5½ stroke; 40 H. P. at 900 R. P. M. Bosch high tension ignition. 18 gal. gasoline tank under front seat. 36 x ½ in. rear tires, 36 x 4 in. front. Selective sliding change speed gear; 4 speeds and reverse, direct on the third speed; 119 in. wheel base, clearance 10½ in. Price, complete, \$4,500. holstery. It has a body of wood and metal with rumble seat and accommodates three persons. The change gear is of the selective sliding type, giving three speeds forward and reverse shaft drive; 105-in. wheel base, weight 1900 lbs. Price, \$2500, with complete equipment.

MODEL 4-40.

The Model 4-40 is known as the gentlemen's roadster, having a specially designed runabout body seating three persons. The motor has 4 cylinders, 5 x 5 1/4, with mechanically operated valves on opposite sides. Tires are 36 x 4 in. all around and the change gears are of three-speed selective type of chrome nickel teel, oil tem-This car has 108-in. wheel base, pered.

straight line design, the front and rear seats being of a somewhat new outline. The body is ironed for a top. The finish is Pullman red with black under body, red upholstery, or Pullman dark blue, blue upholstery. This car seats five or seven passengers and has two additional auxiliary revolving folding seats in the tonneau.

The pressed steel frame is curved upward over the rear axle and has a sub-frame for carrying the engine and transmission, and is well bracketed and braced. The motor has cylinders cast separately with integral water jackets, cooling being by means of a gear-driven centrifugal pump and a flattube radiator with fan. The springs are semi-elliptic, 41½ x 2¼ in front, 46½ x 24 in. rear, the rear springs being of the



Chassis of the 40 H. P., 7-passenger Pullman touring car. Cylinders $5 \times 5 \%$, acting and expanding brakes on rear wheels. 4 speed, selective change speed Dropped frame, giving good rear axis frame clearance. Wheel base, 119 in.

semi-elliptic platform type. The front axle is a steel drop forging of I-section and the rear is of the floating type with pressed steel housing, nickel steel shafts and gears and a "V" style torsion rod. The change speeds are obtained by sliding gear selectively operated, having 4 speeds ahead and a reverse with the direct on the third speed. All gears are of chrome nickel steel, oil tempered and mounted on Hess-Bright annular, ball bearings. Drive is by shaft to a floating rear axle assembly, from which a housing is of pressed steel and the gears and shaft are of nickel steel. A stiff

a straight line combination of wood and metal body, double side entrance tonneau and front and rear seats of new design. Bodies are all ironed for tops and specially braced wherever strain is delivered. All seats are fitted with soft-edged, spring-cushioned backs and seats, finished in best quality, hand buffed, straight grained French finish leather. The color is Pullman red with black underbody and red upholstery or dark blue with upholstery to match.

THE MOTOR.

The power plant consists of a 4-cylinder, vertical 4½ square motor, cylinders cast

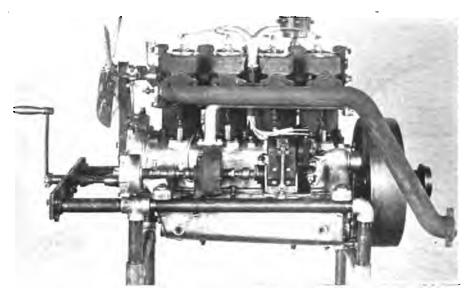


Fig. 4. View of the exhaust side of the 1909 Pullman motor, showing the form and method of attachment of the exhaust manifold. The location and method of driving, the centringal water pump and magneto. Also the next arrangement of the secondary wires. Special lubricating system described in the text.

V type torsion rod is used, thus relieving the springs of bevel gear reaction. The wheel bearings are Timken rollers and all wheels have 12 1%-in. spokes, are 36 in. in dia., and carry 4-in. tires on the front and 4½-in. on the rear. Power is supplied by a 4-cylinder vertical motor with cylinders cast separately, water jackets and cylinder heads integral, 5-in. bore and 5½-in. stroke. This motor is rated at 40 H. P. at 900 R. P. M. Ignition is by Bosch high tension magneto, with distributor, also single coil and switch, with storage battery supplying two separate sets of ignition.

Lubrication is by the new self-contained system as in the other models. Two contracting and two internal expanding brakes are fitted on the rear wheels and steering is by 16-in. hand wheel and an irreversible gear. This model, which is known as M, weighs about 3250 lbs. and completely equipped, including two acetylene headlights, two side oil lights, tail light, horn tool kit and gas generator, sells for \$3500. Top and glass front are extra.

THE NEW MODEL "K."

The new car of the Pullman line is a 30 H. P., 5-passenger, light touring car, with

separately with water jackets and heads integral, and the rating of 30 H. P. is given at a speed of 900 revolutions. The valves are on opposite sides and interchangeable. The crank-shaft is a one-piece nickel steel forging.

SPECIAL LUBRICATING SYSTEM.

The crank case forms the oil reservoir from the lower portion of which the oil is forced by an eccentric pump located at the lower rear end of the case to the top of the upper compartments of the case from which it feeds to the splash basin. The height of the oil in this base is controlled by eccentric valves which have stems extending to the outside of the case, the outer ends being fitted with small indicating pointers which move over a scale with quarter-inch spaces. By moving these pointers the valves are correspondingly adjusted so that the height of the oil can be changed either up or down as required.

The power plant is mounted on a subframe of channel section, pressed steel which, as well as the main frame of similar construction, is hot-riveted. There are three main cross members and two braces to the sub-frame. At the rear of the en-



Fig. 5. Model K Pullman, a 1909 addition to the Pullman line, having a 4-cylinder, water-cooled engine cylinders cast separately, 4½ x 4½, 30 H. P. at 900 R. P. M. 15 gal. gasoline tank under front seat. Bosch high tox-ion magneto, tires 34 x 4 and 34 x 3½, 3 speed and reverse, selective aliding gear. Shaft drive, 106-in. wheel base, clearance 10 in. Weight, 2,250 lbs. Price, \$2,000.

gine a clutch of the ordinary leather-faced cone type, but fitted with cork inserts, is mounted and transmits the power to the three-speed selective sliding gear, all gears of which are oil treated chrome nickel steel and mounted on Hess-Bright ball bearings.



Fig. 6. Lower half of Pullman crank case, showing the oil pump at the left and the oil sight gauge and oil filler. Also on the side of the case are shown two small pointers which can be set to determine the height of the oil level in the case. Each of these pointers control an eccentric overflow valve.

As in the other models, the drive is by shaft to a floating type Timken rear axle construction, the housing of which is of pressed steel autogenously welded, thus forming a one-piece housing. The tubes taper toward the outer ends, the thickness of the metal increasing as the outside diameter decreases. The gears which are placed in position from the front, are cov-

ered by a piece which is bolted in place and which carries the bearing for the bevel pinion shaft and also the rear support for the V-shaped torsion rod.

Two internal expanding foot operated brakes occupy drums on the rear wheels, while an emergency brake is fitted on the rear of the transmission shaft.

A 15-gallon gasoline tank is provided under the front seat, feeding by gravity to a Stromberg float feed carburetor. The springs are 40 by 2 in., of semi-elliptic type at front and 50×2 in. at the rear. The front axle is a steel I section drop forging. A 106-in. wheel base gives this car easy riding qualities, yet is short enough to keep it from being cumbersome. The tread is standard and the road clearance is full 10 inches. A double set of ignition apparatus is provided as on the other models, each being independent of the other.

With an equipment including two acetylene headlights, two side oil lamps, horn, tool kit and generator, the car sells for \$2500, its weight, fully equipped, being about 2250 lbs. This Model K is made not only as a touring car, but as a runabout, and is also fitted with a toy tonneau body, all at the same price as the touring car. The Model L is also fitted with a top tonneau, price of which is \$1600.

INTERNATIONAL EXHIBITION OF RAILWAYS, AUTOMOBILES, ETC., IN ARGENTINE REPUBLIC

An international exhibition of railways, automobiles, etc., will be held from May to November of 1910 to celebrate the Centenary of Independence of the Argentine Republic. This exhibit will be of great interest and benefit to American manufacturers, from the fact that Europe will be very well represented.

Casco, Odell Bros. & Co., importers, manufacturers' agents, 2050 Pasco de Julio 2054 Buenos Ayres, Argentina, are making a special offer to American manufacturers to look after the exhibits and the sale of same, and will also take care of shipment of goods, etc. Full particulars regarding the exhibit can be had from Argentine consuls.

The Automobile Club of France will hold a commercial vehicle competition from October 15 to November 15 in the suburbs of Paris. The competition will be held under the auspices of the War Department, and partly under their regulations, the army having decided to offer a substantial indemnity to all commercial vehicles conforming to the successful type evolved from the competition, on condition that the machines shall be at their disposition in time of war.

An excellent solution for removing verdigris and stains from the brass work of motor lamps can be made by mixing a good metal polish with wood alcohol. This should be applied to the brass and allowed to dry, when it may be rubbed off with a woolen cloth, leaving the surface in excellent state for polishing.





If The only practical result of speed and other contests is to prove the qualities that make a car right for touring. A car that will stand a speed test will prove reliable in a tour of any length. Only the most reliable and perfectly constructed ignition apparatus can give satisfactory

service in touring, races and contests demand-

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¶ No other means of igniting gasoline automobile engines equals the

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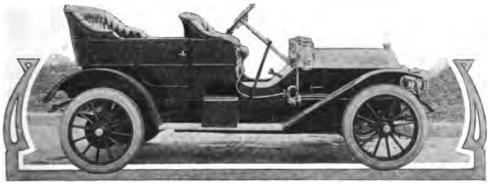
for regularity, durability, and continuous operation. The use of it assures the best possible engine performance if other conditions are right.

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1909 CARTERCARS



HUGH DOLNAR.

The Cartercar, based on friction-drive patents issued to Byron J. Carter, began its commercial existence in 1906. Carter had his first car, friction driven, on the road in 1903, and made and sold some 10 or 12 cars, all friction driven, before 1906.

Carter's inventions were taken up by the Motorcar Company, which sold 101 friction driven cars in 1906, 264 in 1907 and 325 in 1908. The Motorcar Company changed its name to the Cartercar Comdust and abundantly lubricated with clean oil. It was also well known to the Cartercar engineers that many attempts had been made to find a suitable and satisfactory enclosure for automobile driving chains, with so little success that none of these chain casings had come into much use. Mr. Carter died suddenly in 1908, and the work of designing the Cartercar chain casing was taken up by Mr. R. A. Palmer, general manager of the Cartercar Company, who produced the chain casing here



Fig. 1. Carte-car 1909, Model K. 5-passenger towring car. Wheel-base, 103 ins. Gauge. 54½ ins. Tires all 32x3½ ins., quick detachable. Motor, two cylinders, 5½x4½ ins., opposed, 4-cycle, water cooled, thermal water circulation, nominal 24 H. P. Ignition, jump spark, with double coil, vibrating, and 12 dry cell battery. Drive, friction, with cased-in chain to balance gear and seminoating rear axies, same as Fig. 1. Weight, 1850 lbs. Price, \$1.350.00, including 5 lamps, mats, horn and tools. Cape Top. \$100.00 extra.

pany in November, 1908, and removed from its Detroit factory to much larger premises in Pontiac, in the same month, November, 1908, with the intention of producing 1000 cars in 1909.

CASING IN THE CHAIN.

All Cartercars sold before 1909 had naked chains, and it was decided to make a determined effort to find a really good chain-casing, dust-proof and oil-tight, which would perfectly protect the chain and make it possible to lubricate the chain with clean oil. It is well known that the clean, well-lubricated chain is an economical and durable power transmission agent, having less friction than commercial toothed gearing if fully protected from

first shown and described. The new casing was on the road in July, 1908, and was tested out by extended road trials. Only very slight changes were made from the original form of this Palmer chain casing, patent pending, and in the 10,000 miles of test on the road the new casing has shown no failure.

Naked chains gave constant annoyance by stretching due to rapid wear, and had a life of only about 3000 miles before requiring renewal, while a cased-in chain, lubricated with clean oil, showed only one-sixteenth of an inch stretch for 5600 miles of road covered, with almost no side wear at all, and was about as good as new at the end.



Fig. 2. Cartercar 1909, Model H, seats for either 3 or 4 passengers. Wheel base, 100 ins. Gauge, 54½ ins. Tires all 32x3 ins., quick detachable. Motor, 4 cylinders, 4x4 ins. nominal 25 H. P. Motor 4-cycle, water-cooled, thermal circulation. Ignition, jump spark, 4 coils with vibrators, current from storage battery with 6 dry cells reserve battery, friction drive. Weight, 1600 lbs. Price, for four passengers, with Baby Tonneau, \$1,100.00. With doubled divided rear seats, 4 passengers, \$1050.00 With two small rumble seats for four passengers, \$1,025.00. With single rumble seat; as shown in illustration, \$1,000. Prices for all three styles of bodies specified include 3 lamps, mats, horn and tools.

This good work of the encased chain led to the belief that the chain was by far to be preferred to the bevel gear, and all the 1909 Cartercars will be fitted with chains in the Palmer casing, construction fully shown in Figs. 5 and 6 chain case.

THE CASING.

The general scheme of the Cartercar chain enclosure is to support the rear end

on vulcanized fibre flanged bushes, revolubly mounted in grooved flanges which are applied to the balance gear drum ends, and to hang the forward end of the chaincasing by a globe end stud, horizontal, and a globe-seat link hanging down from the chassis frame cross-girt to which the link is jointed.

To avoid as much as may be the twist



Fig. 3. Cartercar 1909 Coupe, best materials throughout, electric lighted, with pockets, trimmed in leather or broadcloth, on Cartercar 1909 model G chassis, opposed cylinder motor, nominal 24 H. P. Friction dive with cased-in chain to the balance grar and divided rear axies. The tires are all 32x3½ ins., quick detachable. Weight about 2000 lbs. Price, \$1,750.00, including 5 lamps, mats, born and tools and storage battery for lighting the body, side lamps and tail lamp, all electric. Especially adapted to physicians' requirements.

which is inseparable from the variable rise and fall of the rear axle and the crossshaft ends, floating plates, also vulcanized fibre bushed, are placed one each side of the casing, the fibre bushes revolubly mounted on the cross-shaft, and the floatTwo of the 1909 Cartercars, Models H and L, will have four-cylinder motors. One, Model L, is shown at the head of this description. This 1909 Model L is after-passenger touring car. Wheel base, 110 ins.; gauge 54½ ins.; tires all quick

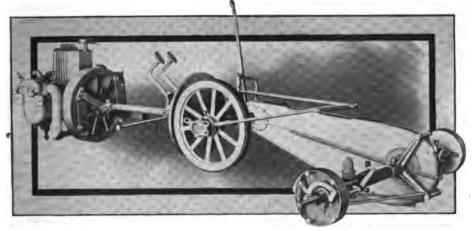


Fig. 4. Carter 1909 drive, with opposed cylinder 24 H. P. motor, motor design and construction by the Cartercar Company. The friction disk is of aluminum alloy, with paper friction wheel, disk and wheel, new, each 20 ins. diameter. The paper friction face is 1% ins. wide. New paper frictions cost \$3.00 each. The paper friction can wear down % on a side. % in. total diameter reduction, life, from 3000 to 5000 miles. The paper friction sides on the counter shaft. The aluminum disc is forced against the paper wheel by a pedal controlled rocker, with ball thrust bearing interposed between the rocker arms and disc-hub. The wheel traverses the disc by a hand-lever, friction retained in any desired position, to give any speed forward or backward within the range of the friction drive. The high reverses speed is about one-sixth of the high forward speed. The friction disc shaft is keyed to a ball having its two ends fixed to flat springs boiled to the fly wheel rim, the springs moving fore and aft to permit the engaging and disengaging disc movement. The chain is covered by a dust-proof oil-tight aluminum casing.

ing side-plates being retained by outside applied plates. The chain casing twist is small, and the sliding-fit clearance of the floating side plates is enough to take care of this slight twist, although this chain casing is fitted closely enough to be practically dust-proof, the oil in the casing remaining clean at the end of 5000 miles of very hard road work.

The extended and severe tests to which this chain-casing has been subjected, it is claimed, have developed no fault at all.

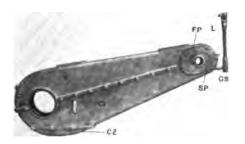


Fig. 5. Cartercar 1909 aluminum casting chain casing. This casing is in three principal pieces, C. Cl. C2. and weights, complete, 18 pounds. Patent pending. The two principal casing members are joined horizontally, flanged and retained with round-head machine screws. The third member is an applied lower part, small size, is fixed with screws to the lower main member. This lower cap is the lowest part of the chain case, and if damaged by contact with road obstacles can be cheaply replaced, and when removed gives access to the chain and permits cleaning the chain casing interior. The front end of the casing is suspended from the chassis frame by the link, L and a globest study of the cast of the chain and study at GS.

detachable, 32x3½ ins. The motor cylinders are 4½x4½, 30 H. P., 4-cycle, water-cooled, centrifugal pump water circulation. Ignition is by jump spark and magneto with one non-vibrating coil, with drycell reserve battery, one set of spark plugs only. Drive, friction, with chain, completely encased, to divided rear axles, semi-float, driving wheels. This model weighs 2100 pounds and sells for \$1600, including 5 lamps, mats, horn and tools.

All will have the friction drive, an aluminum alloy disk and paper wheel, each 20 ins. diameter, new, which gives any desired speed change in either direction, within the range of the mechanism, and avoids the use of the clutch and toothedgear speed-change, making, in the belief of the Cartercar Company, a lighter, cheaper and in every way better motor car drive than is possible with any arrangement whatever of toothed gearing, no matter how costly or how perfect in choice of materials, in design and in workmanship.

The illustration, Fig. 4, is a perspective view, left and rear oblique, of the Cartercar, opposed cylinder motor motive assembly, showing the motor at the left, the fiy-wheel with bail-springs and bail, friction disk shaft, pedals, friction disk, paper wheel and paper wheel hand lever and transversing linkage, the chain casing and the rear axle with brake shoe and brake-shoe action.

Carter's original drive, patented, was 3

studs fixed in the fly-wheel hub on which the 3 eyes of a 3-armed spider keyed to the forward end of the disk-shaft were fitted to slide, to permit the fore and aft engaging and disengaging friction-disk movement. The original coiled spring which normally disengaged the disk and paper wheel has been retained in this new disk-shaft drive, the springs bolted to the fly-wheel rim and the shaft bail-driver serving as carrying and driving links and having the merit of being flexible without joints, thus avoiding points demanding lubrication.

The form of the friction drive with motor in front makes it convenient to drive the rear wheels with either one chain to the balance gear drum, or with side chains to the rear wheels.

Chain wear is almost wholly obviated by the new 1909 chain case, so that the chain life is increased at least ten-fold, from

ends and tapered to take the wheels at the outer ends, key and hexnut wheel retention, and each axle is carried on two circles of Hyatt roller bearings. THE WHEELS. The wheels are all to take 32-inch tires, all have malleable cast iron hubs and flanges, and all have 12 spokes each, spokethickness 14 ins. for heavy wheels and 11/2 thickness for the Runabout wheels. THE SPRINGS.

Fig. 6. 1909 Cartercar aluminum chain casing construction. Casing vertical cross-sections in vertical planes of rapriled and the cross shaft. On the rear axie the casing is revolubly mounted in grooved fianges of gray iron, G. F., applied to the balance hubs fianged fiber collars, F. being interposed between the casing metal and the grooved fianged metal. The fibre fianged collars avoid metallic contact, are slightly elastic and so permit the case a small universal movement and also prevent the chain-casing oil from traveling along the live axies to the rear hub brake drums. The rear sprocket is marked S. This is the first chain casing noted by the writer in which the rear end was revolubly mounted. The eyes of the side plates are bushed with fiber at F. F. F. where these floating side plates are revolubly mounted on the cross-shaft. Side plates, S.P. applied to the chain casing members, furnish an enclosed chamber of oval outline in which the feating plates have free movement while remaining practically dust proof. There is abundant side clearance between the cross-shaft sprocket hubs and the floating plates, F.P. This chain-casing support is not theoretically ideal, but in practice it gives entirely satisfactory results, showing no appreciable friction and keeping the chain casing oil absolutely free from dust.

3,000 to 30,000 miles, and probably more, judging from the condition of a cased-in chain at the end of 5,600 miles of fall and winter work on bad roads.

THE AXLES.

These are Weston-Mott Co., Flint, Mich. The front axles are steel tubes, two weights, 2 ins. out. dia., ¼ and 3-16 respective wall thickness. Both axies are dropped 2 ins. in the middle. The malleable cast-iron spring perches are fixed to the axle tubes by pinning and brazing. The steel drop forging axle yokes are all 3% ins. opening, and are fixed to the axle tube ends by pinning and brazing. stub axles are steel drop forgings, 1% ins. and 1 3-16 ins. respective large diameters. All front wheels are on 2 circles of balls in 2-point ball-bearings, adjustable, % dia. balls inside and 1/2 in. dia. balls outside. The yoke pins, hardened and ground steel, are % dia., are in steel bushes, hardened and ground, load carried on the bush flanges.

1

The rear axle steel tubes are 21/2 ins. dia., ¼ in. wall for the heavy axles and 21/4 ins. dia., ¼ in. wall for the light axies. The rear axle spring perches are forced on the axle tubes and pinned. The brakedrum flanges are pressed on the axle tube ends and retained with 4 rivets, 5-16 dia. in each hub. The balance gear is 8 spur pinions.

The live rear axles are semi-floating, are steel, 11/8 dia., squared at the inside

all under the pressed steel chassis frame and rear springs all outside of the chassis frame sides. The front springs are all jointed to the chassis frame eyes in front and linked in the rear. All rear springs are clipped to the rear axle perches and are linked at each end to down-hanging links, placed under tension by the load. and right and left thread struts, adjustment pinching screw retained, are placed between the rear axle sleeves and the crossshaft boxes.

These are all half-elliptics, front springs

Two spring equipments, heavy and

the spring.

light, are used. The heavy springs are all 2 ins. wide, front 45½ ins. long, 7 leaves, top 3 leaves banded together. The heavy rear springs are 53 ins. long, 8 leaves, top 3 leaves banded together.

The light springs are 38 ins. long x 1 % ins. wide in front, 5 leaves, top 3 leaves banded together. The light rear springs

All the brakes have the same general construction, all internal, in pressed steel drums fixed to the rear wheel hubs, all with malleable cast-iron jointed expanding shoes, fibre faced, all cam-rocker expand-The large brake-drums are 12 ins. dia. x 2 ins. face. The small brake-drums are 10 ins. x 134 ins. face.

Fig. 7. Cartercar, 1909 control. The spark and throttle hand lever are ratchet retained on top of the steering wheel in all 1909 Cartercars. In Models H and L, the two 1909 Cartercars having four-cylinder motors, the steering is by a soft steel worm and hardened steel worm gear. In all other 1909 models the steering is by a set bevel pinion 17 teeth, 8 d. p., engaging a bevel sector, 68 teeth, full circle, 8 d. p., steel casting. The single lever at the driver's right is moved to shift the paper wheel and is friction retained wherever left by the driver's hand. The left pedal, latched, is pushed forward to engage the friction disc and paper wheel, which are normally disengaged by the colled spring on the disc-shaft. The right pedal, latched, is pushed forward to apply the rear hub internal expanding brake shoes. A muffler cut-out plunger pedal, not shown, is fitted to the 1909 cars.

are 45% ins. long x 1% ins. wide, 6 leaves, top 3 leaves banded together. The leaves of all Cartercar springs are tongued and grooved.

THE CHASSIS FRAMES.

The frames are all pressed steel, channel section sides, with pressed steel crossmembers and substantial gussets all hot-The chassis frame sides are curved up over the rear axles in all models. The Models K and H chassis frames are parallel 34% ins. wide for Model K and 321/2 ins. wide for Model H. All other Cartercar chassis frames are in two widths, 34% ins. wide in the rear and 32 ins. wide in front. The heavy frames

The Quaker City Automobile Club, of Philadelphia, has decided to hold a second big race in December, in addition to the 200-mile contest in Fairmount Park on October 7. A road contest from Philadelphia to Pittsburg and return, over the route of the proposed \$5,000,000 State highway is also being planned.

Only the rear hub internal brake shoes are fitted, the friction drive reverse being instantly available for an emergency brake which is highly effective.

greatest side frame depth is 31/2 ins. The

light frames greatest side-frame depth is

3 ins. All the springs have leather pieces

interposed between the spring perch and

BRAKES.

WORKMANSHIP.

The plant at Pontiac includes examples of the latest and best American duplicating machine tools, and grinding is very largely employed. The principal shafts, as well as the pistons, piston rings, cylinders and crank-shafts are fitted by grinding, and the Cartercar shops produce many of the ball-bearings included in the Cartercar construction; these ball-bearings of home construction are all 2-point, and adjustable. All ball bearings are in dust-proof casings.

The Professional Chauffeurs' Club of Philadelphia is actively canvassing local motordom in an effort to boost a bill, which is to be introduced into the Legislature by Representative Marvin, of Pike County, requiring every professional chauffeur to pass a rigid examination before being licensed to drive a car.

THE "STEIN" PNEUMATIC AUTO TIRE

The Stein Pneumatic Auto Tire illustrated herewith is the product of the Stein Double Cushion Tire Company, Akron, Ohio.

This tire embodies many new features. One of the most important is the fact that



The "Stein" Pneumatic Auto Tire.

the inside of the tire is flush with the entire inner surface, thus forming a continuous, naturally round tube. This construction absolutely prevents water, dirt or other foreign substance from entering the tire. No bolts or lugs are required to keep the tire in place, and it is prevented from creeping by the valve. The tire is made in all standard sizes, and fits any make of rim.

KEMIZITE

Kemizite is a tire puncture healing compound recently placed on the market by the Auto Tire Security Company, of Detroit, Mich. This substance resembles cream in color and consistency, and is perfectly harmless and clean in itself. It is not used in sufficient quantities to reduce resiliency, and as it does not have any bad effects on the inner tube it does not prevent patching in case of a blowout. Kemizite has been used in New Zealand and Australia for some time, and only lately has been imported in this country.

TIRESELE

The Tiresele Company, of 53 and 55 Bank street, Newark, N. J., has placed on the market a new product called Tiresele, which is designed to eliminate punctures and prevent porous tires from losing air. This compound is a very fine powder, which is mixed with water and squirted into the inner tube. This mixture is claimed not to affect the rubber in the least, and is harmless to hands, clothing or varnish. It is put up in boxes, four boxes to the carton, listing at \$2.50 per wheel, or \$10.00 for one carton, enough for four wheels. A special pump is furnished for 50 cents extra. Tiresele is also put up for motorcycle and bicycle use.

THE "SPARKER" BATTERY

The "Sparker" is one of the latest ignition batteries placed on the market. It has been designed and manufactured by the Rock Island Battery Company, of Cincinnati, especially for automobile ignition work.



The "Sparker" Battery.

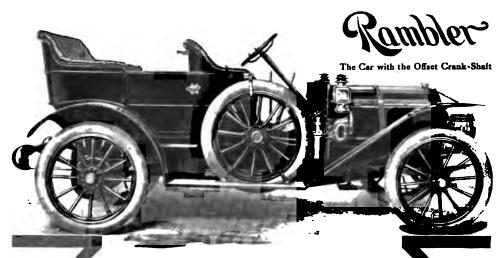
This battery is claimed to be a handmade article and is guaranteed to be 15 to 20 per cent. more efficient than the ordinary battery, due to the fact that Japanese manganese is used in its construction which it is claimed is a much better quality than the Russian product.

"STAY-SHINY" METAL PRESERVER AND "MAGICLEAN" WOOD POLISH

Lawrence & Welch, of Sterling, Ill., have recently placed on the market a metal polish preserver and a wood polish compounded especially for automobile use. Stay-Shiny metal polish preserver is a sort of lacquer which is applied to the polished article by means of a brush, thus effectually preventing the article from further tarnishing. It is absolutely grease and waterproof, and will stand all heat and weather exposure.

"Magiclean" wood polish is a liquid preparation for cleaning and polishing automobile bodies, leather trimmings, cushions and tops. It is made of strictly neutral oils, which leave a hard, glassy, transparent gloss that will last for months.

Mr. Jacob Neuman, Vice President and General Manager of the Stein Double Cushion Tire Co., died on March the 27th, 1909.



Model Forty-four, 34 H. P., \$2,250.

Spare Wheel, with Inflated Tire, Brackets, and Tools, \$74. Magneto, \$150.

TRY IT ON THE HILLS

Test this car at half-speed on a hill or sand road where power—and every ounce of it—is needed. Notice how steadily and powerfully it pulls when running slowly under load.

The capacity of the Rambler engine for doing this extra work is most noticeable at low engine speeds. This is because of the Offset Crank-Shaft.

All that power which in other engines is lost through friction on the bearings and cylinder walls is added to the driving force by the Rambler Offset Crank-Shaft. It reduces friction, eliminates hammer on bearings, gives more power. The Straight-Line Drive delivers the power direct and with least frictional loss to the rear axle.

Seven-passenger model, 45 horsepower, with Offset Crank-Shaft, \$2,500. Other models, \$1,150 to \$2,500. A new Rambler catalog has just been issued. It describes and illustrates all distinctive features of new Ramblers—the Offset Crank-Shaft, Spare Wheel, Straight-Line Drive, etc. A copy on request.

THE CAR OF STEADY SERVICE

Thomas B. Jeffery & Company, Main Office and Factory, Kenosha, Wis. Branches and Distributing Agencies: Chicago, Milwaukee, Boston, New York, Cleveland, San Francisco

SOME NEW AUTOMOBILE CLOCKS

The New Haven Clock Company, New Haven, Conn., has placed on the market a line of 8 day automobile clocks, known as the New Ormrod, Dienne, and Sayannah.



In order to suit the particular conditions of automobile service, a specially designed movement is fitted which withstands the jar of the machine when in motion, and yet



The "New Ormond."

is in perfect beat when the car is stopped. The case is dust and water proof. The clock is attached to the car by a locking device operated easily and quickly. The case is so constructed that there are no winding keys, regulating lever, screws, etc.,

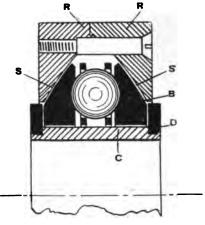


on any part of the front or sides, thus making it easily polished.

To wind these clocks it is only necessary to unscrew the water-tight bevel. The clocks are finished in either brass, nickel or gun metal.

THE "RBF" DOUBLE ACTING THRUST BEARING

The section herewith illustrates a new thrust bearing designed to take axial thrust in either direction. This bearing is manufactured by Societe Francaise des Roulements a Billes (RBF) and is handled in the United States by the International Engineering Co., 1779 Broadway, New York City.



AUTOMOBILE TRADE JOURNAL

Sectional view of the "RBF" Double Acting Thrust Bearing; only one-half of the bearing is shown.

By referring to the illustration it will be seen that the bearing consists of two outer rings, R, R, held together by two screws. The outer rings are provided with a number of oil holes, which afford effective lubrication. These two rings are provided with spherical seats S, S, and corresponding ball races B, B, which arrangement permits the bearing proper to adjust itself for deflections of the shaft and thereby distribute the thrust uniformly among all the balls. The ring D is put on the collar C after being heated in a bath of oil and, on cooling, is found to have a perfect fit.

MONARCH OPPOSED MOTORS

Monarch Motor Manufacturing Company, 1592-1600 N. Halsted St., Chicago, are manufacturing a number of opposed type motors, Model A of which is shown in the accompanying cut. This concern manufactures air cooled as well as water cooled motors. The air cooled motors are made in seven sizes with the small size, 41/2x41/2 and the larger size, 5x 5, also made with a water cooled cylinder. The motors are offset, 2-cylinder opposed, and are mechanically operated. The cylinders are cast of gray iron and are designed to put spark plugs either on top or end. The crank cases are so constructed that by removing four screws one can take off the upper part, making the connecting rod bearings easily accessible. The connecting rods are of the hinge type; having two screws tapped through opposite sides of the hinge, secured by lock nut and cotter pin and are fitted with die cast white metal bearings. The crank shafts are of steel drop forgings. The piston pins are of steel and are secured by set screws which in turn are locked by cotter pins.



Monarch Model "A" 14 H. P. Air-cooled Motor, 4%-in. bore and stroke. Price, \$150.00.

The pistons have three eccentric expansion rings with lap joints, which are returned and ground, and have cooling ribs inside. The valves are of liberal dimensions, have carbon steel stem and nickel steel head. The stems are fitted with collars of special design to hold the springs in position. The valve lifter rollers are of steel, large in diameter, and rotate on drill rod pins. The valve lifters are fitted with compression springs, invisibly located in sleeves or guides to insure a positive and uniform contact of the rollers and cams. They also have adjustments fitted with The half time gears are enclosed in the crank case, the large one is of bronze and the small one of steel. The intake manifolds are of brass, can be used on either side of engine, and will admit the use of any standard carbureter. The bearings are all of bronze and white metal, and of very liberal dimensions. The air cooled cylinders have exceedingly deep fins, fins in pistons and ventilation tubes which admit constant change of air to crank case.

The prices of these motors range from \$140 to \$200 F. O. B. Chicago, Ill.

"FEDERAL" AUTOMOBILE TIRES

These tires are manufactured by the Federal Rubber Co., Milwaukee, Wis., on the well-known wrapped tread principal. The tire carcasses are first made up on the proper form, the skeleton of same being the finest grade of South Sea Island fabric procurable, which is coated with the best Up River Para rubber and built up in successive layers by expert tire builders.

When the fabric body of the tire is finished, it is covered with 1/2 in. pure gum

rubber, then removed from the form, a rubber curing bag placed inside, and subjected to partial vulcanization in mold, the bag expanding the tire and forcing the fabric into the exact position in which the tire is to be used in service.



Section of the Federal Wrapped Tread Automobile Tire.

After this, the rubber tread of the tire is applied. It is then tightly wrapped with fabric, and is now ready for final vulcanization in open steam, being placed on a special form and assuming identically the same shape as it would while carrying the weight of a car.

"RADIUM" TIRE CHAINS

Among the specialties manufactured by the General Accumulator and Battery Company, of Milwaukee, are the "Radium" single and double tire chains shown in the accompanying cut. They consist of a plate which fits between the spokes of the wheel. On each side of the plate there is one or two clips, as the case may be, into which the ends of the chains snap. These chains



"Radium" single and double tire chains.

can be attached instantly without jacking up the wheel. There are no wearing parts except the chains themselves and these can be replaced for 25 cents each. These chains are made in three sizes, each of the single and double, and range in price from 75 cents to \$1.00 each for the single chain and from \$1.00 to \$1.25 each for the double. They are also sold in sets of 8, 12 and 24 at lower rates.

THE "ISOTTA" RACING MAGNETO SPARK PLUG

Eli J. Bushey, of 1777 Broadway, New York City, who makes a specialty of spark plugs for racing purposes, is offering the autoist a spark plug called the Isotta, which he claims will not short circuit or allow oil to get into the inside of the shell or core.

THE "POWELL" MUFFLER

The accompanying cut illustrates the 1910 Powell pressed steel muffler made by the Powell Muffler & Timer Company, Inc., 42 LaFayette street, Utica, N. Y.

This cut shows the muffler opened so that the perforations in the baffling plates can be seen, it also shows the manner in which the tie rods are covered to protect



The "Isotta" Racing Magneto Spark Plug.

The shell of this plug is made of brass, nickel plated. The electrode is steel, the mushroom or umbrella shaped head being a composition of steel and iridium. The core is made of a lava composition and is fitted by a perfect mechanical operation, which does not need the use of washers, packing or gaskets of any kind. The price of this plug originally was \$2.00, but, in order to introduce this plug to the trade, the price has been reduced to \$1.50.

STAR CUTTING COMPOUND AND DUTCH OIL SOAP

The White Star Refining Company, Buffalo, N. Y., has recently placed on the market two new products of use to automobilists, namely, Star "A" Water Soluble Cutting Compound and Dutch Oil Soap.

The Star "A" Water Soluble Cutting Compound is designed for use of automobile manufacturers and by machine shops for lathe work, drilling, tapping, screw cutting, automatic machines, etc. This compound is soluble in water and makes a perfect emulsion.

Dutch Oil Soap is manufactured particularly for the cleaning of automobile bodies. It is absolutely a neutral soap which will not damage the finest surface. Mixed in somewhat stronger proportions, it makes a good medium for cleaning the running gear.

Buying a tire pump without a pressure gauge on it is a saving that costs many dollars in tire wear, the extra wear being due to improper inflation.

The "1910 Powell' pressed steel muffer. them from the heat. This muffler is made in 5 and 6% inch diameters and of any number of sections that may be required to properly muffle the different sizes and types of motors. The large size is made from 16 gauge and the small one from 20 gauge steel of the best grade that can be procured.

It is the aim of the makers to have the openings through the muffler as large as the exhaust pipe from the motor thus eliminating nearly all back pressure and still have a muffler that is perfectly quiet. Two features of this muffler are that it can be readily cleaned and that by adding more or taking off sections the volume can be changed so that it will not harmonize with the motor.

THE "ANDERSON" WINDSHIELD

The Anderson windshield shown herewith is manufactured by F. W. Anderson & Co., Brown and Uber Street, Philadelphia, Pa.

The upper frame can be dropped or raised without leaving the seat, and is held absolutely rigid in either position. It drops



The "Anderson" Windshield, folded.

towards the inside or steering wheel side of the dash, and does not interfere with the lamps and stay straps on the top. The frame is made of the best mahogany, finely finished and polished. The glass is 3-16-inch imported plate. All fittings are solid brass. This concern also makes a one-plece stationary windshield.

The Most Trying Test

ever given to any Ignition Apparatus under any circumstances was successfully met by the

Splitdorf Magneto

Common-Sense Plug

in the great 10,000 mile Non-Stop run of the Maxwell car. Absolutely faultless Ignition by Magneto and Plugs during the entire run.



¶ Did you ever hear of Efficiency and perfect Reliability being better exemplified?

¶ We build Magnetos with a view to superior construction, excellent service and great durability, but not to run forever without adjustment.

I 10,000 miles - approximately two seasons' run--without a stop and without the slightest suspicion of ignition trouble! If this is the sort of service you would like, you should equip your car at once with a Splitdorf Magneto.

ASK FOR MAGNETO CATALOG

319 Michigan Ave. Woodward Ave.

LONDON

PARIS

C. F. SPLITDORF

WALTON AVE. and 138th STREET BRANCH, 1679 BROADWAY

New York

TURIN

BRUSSELS

BARCELONA

NEW "STEWART" SPEEDOMETER ADDITIONS

The Stewart & Clark Mfg. Co., of 502 Diversey Boulevard, Chicago, manufacturers of the well known Stewart Speedometer, have recently added to their line a number of new models, No. 14, of which is herewith illustrated.

Model 14, is a combination of Model 11, 60-mile multipolar instrument mounted on

standard with e i g h t-day automobile watch. The standard used with this model is a distinct speedometer innovation. It lifts the speedometer away from the dash, making it more easily seen and read. A steel core runs within the standard to the instrument, having a bevel gear connection with the flexible shaft at the bottom of the standard. The arrangement absolutely eliminates the necessity of bends in the shaft: it runs straight to the wheel of the car. The standard is handsomely finished in brass. This model lists at \$75. Model 15, a combina-

tion of Stewart Speedometer Model 12, centrifugal type, and an eightday automobile watch, the latter mounted on top of the speedometer, lists at \$25. Model 16, is a combination of Stewart Speedometer, Model 11, 90-mile multipolar instrument, and Model 14. an eight-day watch.

Modal 14. an eight-day watch. This speedometer is equipped with diamond bearings. The price is \$90. Model 17, is a combination of Stewart Speedometer Model 11, 90-mile multipolar instrument, with Chelsea clock and electric light. The speedometer is equipped with diamond bearings. Price \$125.

The Model 14 Speedometer is also shown herewith in phantom view. There are but two moving parts, viz., the rotor D and the disk H. The rotor, the actuating element, consists of a ring of non ferrus material in which four permanent magnets are imbedded. These magnets are accurately machined from imported Tungsten steel, made to special analysis. The disk, the indicating means, is formed of an alloy metal which is exceedingly light and with low resistance. The rotor rides on hardened ball bearings and the disc on



"Stewart" Model 14 Speedometer; interior view.

a diamond bearing. To the disc is attached a pointer, which moves over an evenly graduated scale of large diameter.

THE GIBSON VACUUM MUFFLER

An entirely new muffler which absolutely gives a vacuum in the exhaust pipe, has just been placed on the market by H. C. Gibson, 630 West 135th Street, New York City. The vacuum, surprising as it may seem, increases with the speed of the engine, and the muffling effect also increases; in other words, at high speed, the engine exhaust is less audible and the vacuum created is greatest. This was demonstrated by means of a U tube filled with colored alcohol, one branch of the tube being connected to the exhaust pipe at a point just before its entrance into the muffler. The construction consists of a pipe of continuously increasing diameter, set spirally so as to provide a continuously decreasing angular velocity of the gases. The effect of using this muffler is to obviate the use of any cut-out, inasmuch as a cut-out would be a detriment. This follows from the fact above mentioned that at high speeds and powers, the vacuum increases. The complete removal of exhaust products provides a perfectly scavenging cylinder with all its attendant advantages. Prices compare favorably with present types of mufflers.

To meet the increase in its business in Boston, the Goodyear Tire & Rubber Co. has secured for its own exclusive occupancy the five-story building at 669 Boylston Street. As soon as alterations are complete the branch will move from its present location at 261 Dartmouth Street.



MODEL F Belt Drive, Jump Spark. Particularly Designed for Fords, But Good on Any Car, \$35.00

There's not much satisfaction in having the pleasure of an otherwise enjoyable trip spoiled by your engine "kicking up" at just the time when you want it to behave, is there?

But don't blame the engine, put the blame where it belongs, on your IGNITION.

If your engine EVER worked right, it can be made to work per-

fectly ALL THE TIME by installing

A K-W **MAGNETO**

The K-W Magneto is the simplest, most reliable and efficient magneto made AT ANY PRICE.



Friction Drive, Jump Spark PRICE, \$35.00

It has no complicated traps or triggers—no moving wires or brushes.

It is absolutely GUARANTEED BY US, THE MANUFACTUR-ERS, to give perfect service AT ALL TIMES and UNDER ALL WEATHER CONDITIONS.

Read the following pages on K-W Ignition and write To-Day for catalogues.

K-W Ignition Company 40 Power Ave., Cleveland, Ohio, U. S. A.

N. Y. Agency: 1686 Broadway, New York.
N. E. Agency: 70 Long Whart, Boston, Mass.
Philadelphia Agency: Jas. L. Gibney & Bro. 211 North Broad Street.
For sale by the Canadian General Electric Co., Toronto, Canada.



Are you tired of Ignition Trouble? Is your patience exhausted every time you take your car out? Are you beginning to think that perhaps after all the automobile is far from the perfection it is cracked up to be?

Well, forget it! Don't get pessimistic, don't blame the engine, but take out those dry cells or that storage battery, throw them into the rubbish heap, and install a

K-W Magneto

The K-W Magneto is covered by our binding guarantee. It will eliminate your ignition troubles

The K-W Magneto will start your engine EVERY TIME without batteries.

Model A, for Jump Spark Run it smoother, evener and without missing and Model A-M, for Make-and-Break, \$35.00. AT ALL SPEEDS OF THE ENGINE.

It will produce a spark MANY TIMES HOTTER than any dry cells, storage battery or other magneto and this spark IS ALWAYS THE SAME. It NEVER deteriorates.

The K-W Magneto will make your engine develop MORE POWER on a weaker mixture than you ever dreamed possible.

There is no "If" or "But" about the K-W, as it works PERFECTLY at all times.

Made in SIX different styles and can be used on any make of car. It will outlast your engine TWICE OVER.

Don't go and pay two or three times the price of the K-W for a magneto which cannot show the results and record which the K-W has behind it.

Buy for service and satisfaction; INSIST on the K-W and know that you are absolutely protected by the binding guarantee of the manufacturers.

Write TO-DAY for Catalogue, FREE for the asking.

The K-W Ignition Company 40 Power Ave., Cleveland, Ohio, U.S.A.

N. Y. Agency: 1686 Broadway, New York.
N. E. Agency: 70 Long Wharf, Boston, Mass,
Philadelphia Agency: Jas. L. Gibney & Bro., 211 North Broad Street.
For sale by the Canadian General Electric Co., Toronto, Canada.

DID YOU EVER

get water in your coil box when you washed your car? Well, if you have, you know how it played the dickens with your ignition until you had wiped off every bit of it.

Now, keeping this in mind, what satisfaction would you expect from a coil which contains not less than ONE TABLESPOONFUL OF WATER after being wound?

The ordinary so-called "high-grade" coil CONTAINS THIS AMOUNT of MOISTURE and that is ONE of the reasons WHY it is always giving more or less trouble.

The K-W Spark Coil





is made by the new K-W special anhydrous, vacuum-impregnating process and its condensers are ABSOLUTELY DRY, have an extremely high specific inductive capacity and are PUNCTURE PROOF.

The K-W Spark Coil will develop a spark MANY TIMES HOTTER than any other coil will give and shoot the mixture THE VERY INSTANT the timer closes circuit (its time constant being several times faster than any other coil.

4 CYLINDER K-W COIL, \$30.00 The K-W Spark Coil has contact points of "Platinum Iridium," an alloy having a value twice that of gold and will not "pit," "stick together," and soon burn away as the ordinary "platinum" points do.

The K-W Spark Coil is also made in a Synchronized coil having an extra unit which acts as a Master Vibrator, controlling ALL cylinders and giving the same ignition to each.

Write for illustrated catalog. It will pay you.

The K-W Ignition Company 40 Power Ave., Cleveland, Ohio, U. S. A.

N. Y. Agency: 1686 Broadway, New York. Chicago Agency: The Automobile Supply Co., 1339 N. E. Agency: 70 Long Wharf, Boston, Mass. Michigan Ave., Chicago, Ill. Philadelphia Agency: Jas. L. Cibney & Bro., 211 North Broad Street. For sale by the Canadian General Electric Co., Toronto, Canada.



Be Sure It's a K

and accept NO OTHER. Our binding guarantee is behind every K-W Magneto, K-W Spark Coil or K-W Master Vibrator.

We guarantee perfect workmanship,—we guarantee perfect service,—we guarantee perfect satisfaction. No one can do more.

Read the testimonial letters given below, hundreds of which have been sent us by automobile owners whom K-W Ignition Apparatus has elevated out of the trouble class:

The Best Investment

Dec. 1, 1908.

The K-W Ignition Co., Cleveland, Ohio.

Gentlemen:-Since the installation of the K-W Magneto on my Mitchell car I have run without batteries in all kinds of weather and under all conditions and have never had the least trouble, and my car never misses fire and has more power on less gasoline than before.

In a nutshell, I consider it the best investment I ever made on my car.

> Yours very truly, (Signed) A. E. HANSON,

Cleveland, O.

On a Trip through the Catskill Mountains

2512 Bedford Ave., Brooklyn, N. Y., Oct. 29, 1908.

Messts. A. H. Green & Co.,

1686 Broadway, New York City. Gentlemen:—In regard to the K-W Magneto purchased last spring from you, I will say that it has been in continual use since put on the Pope-Hartford and has done very satisfactory work. A 1,700 mile trip through the Catskill Mountains and Western New York was made without a battery of any kind in the car. The Magneto gave no trouble whatever.

The Master Vibrator used in connection with the Magneto gives a very satisfactory form of ignition.

Yours truly, (Signed) EDWIN VANDWEER.

Write for booklets and DO IT NOW. They're mighty interesting reading to the man with "Trouble on His Mind."

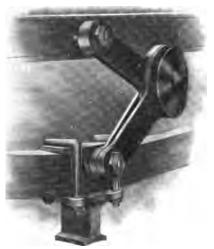
The K-W Ignition Company 40 Power Ave., Cleveland, Ohio, U. S. A.

N. Y. Agency: 1686 Broadway, New York. Chicago Agency: The Automobile Supply Co., 1339 N. E. Agency: 70 Long Wharf, Boston, Mass. Michigan Ave., Chicago, Ill., Philadelphia Agency: Jas. L. Cibney & Bro., 211 North Broad Street. For sale by the Canadian General Electric Co., Toronto, Canada.

THE "CIGLIA" SHOCK PREVENTER

This shock preventer is manufactured by Behrman-Baron Co., 1777 Broadway, New York City. This preventer does not employ friction surfaces in its operation. It is made of steel throughout and is com-

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The "Ciglia" Shock Preventer.

posed of three equal arms, two of which embrace the other. The inner faces of the two outside arms are formed into series of inclined planes which nest into each other. The disc centre of the inner arm has corresponding planes pressed into it. When assembled, these depressions fit snugly into each other. The outside of each of the outer disc arms is fitted with a saucer-shaped washer of pure rubber,



One of the arms of the "Ciglia" Shock Preventer, showing one of the inclined pressed metal planes.

over which is placed a steel disc. The device is then securely held together by locknuts and a through bolt.

In action the spring deflection causes the inclined planes to ride upon each other and compress the saucers of rubber. The more severe the joit of the car, the greater is the resistance of these planes, thus insuring absolute control of the spring action both on the compression and recoil. The surfaces of the planes are lubricated with graphite and the preventer being encased is thus made absolutely dust and waterproof.

This device provides a means of comfortable travel at a maximum speed over any kind of road. It prevents the spring from compressing too fast or too far and vice versa. It is made in one size only, being adjusted to suit any weight of car. The price of a set of four with fittings is \$58.00.

1909 "WARNER" AUTO-METER ADDI-TIONS

The latest additions to the extensive line of Warner Auto-meters, manufactured by the Warner Instrument Co., Beloit, Wis., are the new models O & P; model O of which is here illustrated. Model O is equipped with a 60-mile speed scale and model P with a 100-mile scale, otherwise the two models are alike. The speed indicator consists of the latest 1909 model with 100,000 mile total and 1,000 mile trip odometer.



The "Warner" Auto-Meter; Model O.

The clock is of high grade. It is an eight-day movement with a special winding mechanism doing away with the necessity of carrying a key and removing the bezel to wind. The construction of the reflectors is such that the light is thrown on the dial only. It is claimed with this method of illumination the light is diffused evenly over the 4-in. silvered dials, none being lost by outward reflection from the glass, as when the light is placed outside of the instrument or clock.

The Mackenzie-Walton Company recently organized, in Providence, R. I., for the purpose of manufacturing seamless wire tubing for automobiles, is planning to erect a factory at Pawtucket avenue and Geneva street, Pawtucket, R. I.

YOU WILL NEVER FIND AN ELMORE OWNER DISCONTENTED WITH HIS CAR

Three cylinder, \$1,750 Four cylinder, \$2,500



Get the confidence of a four cycle owner—get him talking about his car—and you will find him telling you more



mechanism, adjusted to a hair as it must be, can stand up for long under the terrific pounding it receives.

of its shortcomings than of its merits.

He may tell you he has a good car, and all that, but—

Then follows a line of explanations and excuses.

It is the same with every four cycle car.

Though the machine may be honestly built—staunch and strong and speedy—nothing can overcome the fact that it is a four cycle car—and therefore liable to troubles which the contented Elmore owner blithely avoids, one and all.

The very fact that the car is a four cycle loads it down with a mass of mechanism you will not find on the Elmore—valves, cams and camshafts, little springs and rollers, lifts and what not.

It is not reasonable to suppose that this

The moment its efficiency begins to suffer
—the moment its delicate adjustment is
destroyed—that moment the four cycle
owner's troubles begin.

You, if you drive an Elmore, know noth-

ing of all this.

Your responsibility practically begins and ends with providing sufficient fuel and lubricant.

That's the reason Elmore owners are contented and satisfied—pleased through

and through with their cars.

No amount of talk will convince the man who owns an Elmore that any other car is better than his; for he knows his Elmore and he would not take a chance with any other car, no matter how many cylinders it has, nor how costly it is.

Go to your Elmore dealer and ride in the

car. And get the literature.

Elmore Manufacturing Company 904 Amanda Street, Clyde, Ohio

Members Association of Licensed Automobile Manufacturers

MECHANICAL AND TECHNICAL DEPARTMENT

EDITORS

Gasoline vehicles—Chas. E. Duryea, Reading, Pa., Consulting Engineer, A. M. C. M. A. Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn. Two Cycle Engines—Hugh Dolnar.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

REGULATIONS OF THIS DEPARTMENT

Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, CARE OF THE CYCLE AND AUTOMOBILE TRADE JOURNAL, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle inquiries will be found in that department.

Questions will not be answered in this department unless the inquirer gives his name and address. The name and address will not be published if so requested.

PUTTING FRICTION DRIVE INTO OLD CAR

[413.] I have a Mitchell runabout, the transmission of which I wish to replace with friction transmission. Is the sliding disk type of friction transmission efficient, and if not, what is the most efficient type? About what sprocket ratio would you advise and what size disk and friction wheel? Motor is 2-cylinder vertical, 3% in. x 4 in. or 4½ in. and is rated 9-10 H. P. I wish compression or the plug or coil is bad. If to build transmission here and would appreciate any information you would suggest.

F. F. ESCOFFIER.

The friction transmission is all right if well made. I do not think I would advise putting it in a vehicle not designed for it. Better take up with the makers the problem and they will surely find some way to make you happy. The friction disks must be carefully supported or they spring and bind the bearings and cause a lot of loss of power. The more the loss, the more pressure is required to make them drive, and the two may so nearly balance each other that there is no power left to propel the vehicle. In this case you will see that the friction drive is not efficient. But with stiff shafts and proper bearings the added pressure does no harm and the drive takes the loads brought upon it in good shape. Use the largest disks that will go into the space at hand. The larger the disks the higher the speeds of the working contacts and the less the pressure required. The ratio of sprockets depends on the relation of the disks to each other. If the disks are the same size as, is quite common, the sprockets should give the same speed as the present high gear.—C. R. D.

BOILING WATER BEST IN ENGINE JACKETS

[423.] Experimenting with a double opposed water-cooled engine, I tried to verify the statements of a certain engineer, claiming that boiling water is the best cooler of an engine. I removed the radiator from the car, and replaced the water tank by an eight-gallon copper tank. Engine has 4 x 4 cylinder and circulating pump. After running car about five miles water would begin to boil and steam. At this moment I would notice a great change in the working of the machine. The engine developed much more power, and the next five miles were traveled in much less I was wondering why engineers would use fans and radiators if a tank would give better service and satisfaction. One day, while repeating the experiment, and before the water got hot, there was a pop, and out came a cylinder head. Now what I want to know is, was the cause of this break the expansive force of water converted into steam in the water chamber, or was it due to a defect in the cylinder walls? I attribute it to the latter cause. Please give me your views. Is it risky to run when water is too hot? SEGUIN, TEX.

Your experiment was good so far as it went, but rather crude. The engine should be designed for that treatment if it is to be used with boiling water cooling. I think the design of the casting is responsible for the cracked head. The water had free circulation to the tank, so no pressure of steam could force the head off. Either the casting was under an internal strain or the head was exposed to an intermittent covering of steam and water. This cooling and heating would likely cause a crack.

Steam is not a good cooling medium. Hot water is. The hotter the water the better. But the engine must be designed for the job. I imagine your great and noticeable gain in power was due to the fact that when hot the charge self-ignited, and thus practically advanced the spark. But the difference between the power of an engine when hot and when cold is readily established. With the engine on the stand apply a brake, and although there seems to be quite a little margin of power, suddenly turning cold water into the jackets will cause such a loss of power the engine will stop. The reason is plain enough, Heat is the source of power and it is not possible to lose this heat to the cold walls and also use it to drive the vehicle. If it goes one place, it cannot be utilized in the other. The proper idea is to work the engine just as hot as the oil and metal and igniting quality of the mixture will permit.-C. E. D.

ONLY ONE CYLINDER AT A TIME WILL RUN

[427.] I read your good advices monthly, the first thing on opening the Journal, and thought I knew about as much as there is to know, but I am stung now; I can't get my engine to work with both cylinders. First cylinder, No. 1 (left), worked all the time; then I changed the intake valve and spark plugs to No. 2, and No. 2 worked and the other idle, Changing a new plug for No. 1, I get them to run at times in both, but mostly only one at a time. Just as soon as I contact the friction it stops the engine.

GULFORD, CONN. GULFORD. CONN. F. J. BERNETT. When the engine will not pull there is something wrong and it is up to you to Test carefully till you find the find it. trouble. First, be sure you have compression. Next, go after the spark. I have fooled most of an afternoon with a plug that I would not change because I was sure it was all right, when it wasn't. nally test the mixture so far as possible. If you can run either cylinder at will the mixture is probably not far wrong. Try heating the inlet pipe. A rag with hot water dripping on it is a good way, but under safe conditions you can heat the pipe with a blow-torch. See answer to C. P. Houtz .-C. E. D.

(Test your timing and batteries, especially if both cylinders spark at once from a single coil.—Ed.)

NO. 382 TROUBLE IS WITH STARTING CRANK

Trouble with Mr. F. Clark's Rambler, Article No. 382, page 84, May issue, is his starting crank. I have owned one of these cars for two years and too have cranked myself blue in the face, but all in vain. At last I solved the problem for once and forever. Cut away the running board

with a circle saw back to the running board brace and about to the tool box in front. This will permit you to lengthen your starting crank about three inches. Any good smith can do this for you. With this increased length of the crank you can throw the engine over with ease (cylinder cocks closed). So much air enters through the cylinder cocks and so much of the mixture escapes that it is almost impossible to start the engine with them open.

I use a light cylinder oil in my transmission. A heavy oil on a cold morning has a gummy tendency which causes the disks of the clutch to drag and consequently makes hard cranking. You will also find it best to use a heavy air cooled cylinder oil in your cam gearing. A light oil is too thin to cushion these gears. Nothing but cylinder oil should be used because it leaks into the crank case thus reaching the cylinders.

Do not be afraid to flood your carbureter. No harm will result from it. Hold the tickler down until the float chamber entirely fills with gasoline and runs out freely around the top, and your engine will start cold at the third or fourth turn.

SCOTT CITY, KAN. G. D. LASLEY.

ANOTHER CONUNDRUM
[421.] As you very aptly put it, in a recent issue of the Journal, here is another patient sticking his tongue out in the telephone, and asking the doctor at the other end of the line for the prescription to cure him

We have a 1905 car with 3-cylinder engine, automatic inlet valves, in same valve box as exhaust valves and placed directly over the latter. Holley carburetor, 1907 model. The action of the engine is very erratic. One day it will run splendidly, take any hill we come to, on the high, and have plenty of strength. The next day it will develop no power at all, and it is necessary to turn gasoline needle valve until the power is developed. Even on a three or four-hour run it will sometimes start out splendidly and at the end of an hour or two start to lose power, and then it will become necessary to drop into a lower gear to negotiate even a moderate We have tried all strengths of springs, and all points for the needle valves, new spark plugs, fixed the contact points of the timer, new batteries, new primary and secondary wires, and the erratic behavior is still there. We are never down and out, but can generally get the engine pulling strong again by fooling with the needle valve.

Do you think if an adjustment were made for the auxiliary air valve, operated from the seat, that any better degree of regularity could be attained? We appreciate the fact of the difficulty of prescribing by long distance, but hope you have been able to see by this very lengthy article that we have tried a great many ways

and have not succeeded in getting a reliable engine. Our conclusion has been that atmospheric conditions make a great director in the suction of the pistons and thereby makes a greater or less lift of the automatic inlet valves and that by making an adjustable auxiliary air valve spring regulation could be secured to compensate for change in atmosphere. Will you please let us have your opinion at your convenience? Our thanks will be due you not only on this occasion, but for the many helpful hints in your previous answers in the Journal, all of which are read with great interest.

PHILADELPHIA, PA.

A. H. INSINGER.

The important thing is to get the symptoms correctly. As I interpret your letter, time is an important factor. Note whether it goes bad quicker on a hot day or on a cold one. If on a hot day the trouble may be in the engine overheating and getting stiff. If you have to stop to adjust the carburetor, it may cool off enough to run again, although thereafter with not much power. I have had pistons too tight, stick and stop the engine, and before I could get to the starting crank they had cooled enough to let the engine start again only to stop me quicker next time. If I fooled away much time hunting for the trouble the engine cooled quite a little and I had a good run when I started up. Be sure your oil is high fire test.

If the run is longer on a hot day, look for the trouble in the gasoline supply. Be sure your gasoline tank has a vent so liquid can get to the carburetor. A cloth or rubber blanket may have rested on your tank vent and closed it so the tank will not supply fuel after the gasoline has been drawn out a little. Increasing the opening at the carburetor will let the engine suck more effectively and get a little more and run for a while longer. Be sure that the gasoline pipes are free. If there is water in the pipe and it forms a trap in the bottom you will get fuel very erratically. The pipe from the tank should have no low parts or should have a drip cock at the lowest point. Be sure your exhaust valves are free and have good springs, and that your inlets are free of short stroke and have light springs. Test all these when hot. In short go over everything when the trouble occurs. Make a list of things that may be wrong. First time start at No. 1. Second time at No. 2, and so on. In this way you finally get at the wrong thing while it is still hot. And if you find the trouble let us hear about it. We are all willing to learn.—C. E. D.

PNEUMATIC TIRES A COMPROMISE

[411.] I recently had my runabout equipped with a stiff anti-skid tread, and the agent from whom I purchased my car advised me strongly against doing so, saying that it was a drawback to the car.

I claim a saving in tire expense and the

agent's claim is, that whereas it saves a little in the tires, the expense is more than counter-balanced in the form of more gasoline used and consequently more wear and tear on the engine.

Please let me know through the columns of your worthy paper the advantages and the disadvantages in the use of such a tread.

I might add that I use my car on rough and ruddy roads.

ARTZ, PA.

I think the agent's advice is right. Any device which makes a tire stiffer and less liable to puncture, also makes it less lively and so requires more power from the engine and mechanism. Further, a stiff, thick thing will not bend so many times as a thin flexible one. This is self-evident and applies to tires as well as to anything else. So if your tires are left sufficiently soft that you may get the easy riding of a thinner tire they will break quickly. The pneumatic tire problem is a compromise. If you want easy riding and easy propulsion use tires that are flexible, but they will puncture easily. If you wish to avoid punctures you must pay the price in hard riding, hard running, and quick breaking of the walls.-C. E. D.

PECULIAR ACTING TWO-CYLINDER OPPOSED MOTOR

[429.] I have been a reader of The Cycle and Automobile Trade Journal for the past three years and have saved the mechanical part of it. But I fail to locate the trouble of a 2-cylinder air-cooled mechanical valve motor on my machine. This ma-Schebler carburetor is used. chine has been in and out. One day it runs well, then it will miss. The makers fix it temporarily, but it is hard to keep adjusted. With gasoline needle valve adjusted one place, one cylinder will explode every time, but No. 2 will not explode. With the needle valve a little more open. No. 2 will fire every time, but No. 1 will not: then it is hard to get the gasoline needle valve adjusted so both will fire regularly. There seems to be no air holes in either inlet pipe. I cannot understand why it acts so. If one coil was weaker than the other would it make the trouble? The machine has been giving trouble ever since it came from the factory. Spark at plugs seems all right. If you now will help me out by your valuable advice I will be very much obliged.

BOIS D'ARC, MO. C. P. HOUTZ.

Why one cylinder will fire and another miss is a problem that has bothered many people. This will often happen and change from one to another without touching anything. If you remove the exhaust pipes and watch the exhaust you may find one cylinder with an invisible exhaust and another spitting yellow flame. As the engine warms up and the speed changes or the throttle position changes, this result

may change and even reverse the conditions. It is probably caused by faulty mixture. The liquid fuel does not fully vaporize and is swept along the pipes. One cylinder probably gets too little or too much and refuses to fire. Varying the carbureter may correct this, only to throw the other out. Try heating the carburetor or supply pipe.

But there are other causes. The spark may be earlier on one cylinder than on the other. This will make a difference in action. Or one compression may be bad because of a leaky valve. Be sure your sparks are both good. If one spark gap is too wide for the coil and battery there will be misfires unless the mixture is very accurately right. A big spark cures a multitude of ills. Test your sparks by detaching the wire from the plug and watching the distance the spark will jump while the engine is running. Or while wire is in place hold one end of an insulated wire against the engine and bring the other end near the plug. If plug is O. K. and compression good, the spark will jump from the plug to your wire more than a quarter of an inch rather than jump through the compression at the plug point. If you fail to get a vigorous jump, there is no why engineers were so slow about taking you find the trouble let us hear from you. —C. E. D.

FRICTION AND OILING OF PLAIN AND BALL BEARINGS

[425] 1st. What is the best oil for ball bearings in wheel hubs. One maker will advise a heavy coach oil and then the next maker sperm oil, etc. Hard oil-grease, gums, gets hard and sticks.

2nd. Car I am building was 14 H. P. air cooled engine, wheel base 91 inches, 34 inch wheel, friction drive, side chains to rear wheels, front wheels are ball bearing. the rear wheels plain friction spindles 1 7-16 in. dia. by 41/2 in. long, the friction wheel countershaft runs in 7 in. long plain bronze bearings. Car will weigh 1000-lbs. This car has been built with great care and is very accurate and true in every The bearings mentioned will alpart. ways have oil and the dust will be excluded. What fraction of H. P. do I lose on account of the countershaft and rear wheel bearings being friction instead of ball bearing?

3d. Can you tell me anything I can do to these push rods and stems that will stop the spiteful metallic click and ring which they make. The valve seats, etc., not being surrounded by water jackets I presume accounts for this sharp ring, which is not heard in water cooled engines.

4th. As you advised me to I intend to strengthen the axle at the weak place by slipping a tube inside the axle and over an offset at stub end. This tube is 7 in. long

(as long as it can be). I would like to braze it to the stub end after they are both in place and do not believe I can get a good job by running the brass from the spindle collar down to it. How can I do it?

ANTHONY, KAN.

AUTOSMITH.

Balls need a light oil. If they did not touch each other they might not need any oil. But they are not so perfect as they look and they seldom are mounted in races so perfect that there is no twisting or rubbing motion so they do have some friction and this requires oil. Graphite is not advised for it acts like small chunks in front of the balls and makes them roll harder. The kind of oil depends somewhat on the service. If the load is heavy I would use a heavy oil in the hope that it would stay under the balls better. It is quite common to pack the bearings in grease. But this is not the best practice although it may be a safe one. The grease tends to keep the balls from rotating and they often slide and wear flat spots on them-This of course ruins them. selves. grease is used it should be very thin. The advantage of grease is that it does not run away and let the balls get dry. It also keeps out water and so prevents rust. If water enters, grit and dirt will also enter. The thin oil must be applied oftener unless there is a reservoir from which it can not escape. Whatever oil is used should be the purest mineral oil. Some mineral oils are bleached with acid to make them look light colored. Generally some of the acid remains. This is likely to attack the polished steel and ruin the balls and races. Soak a bit of waste in the oil and wrap it around a bit of polished steel. Leave it out in the weather for a week or two. If the steel is not protected from rust, the oil is not what you want. If it rusts quickly you may feel sure it contains acid. The difference between a good friction spindle and an anti-friction one is very slight. When both are in good order and the loads light there will be found but 2 per cent. or 3 per cent. difference, but with heavier loads the difference is greater. And with high speeds the viscosity of the oil is greater than any friction of the balls or rollers against each other. It is difficult to say what the difference would be in your case. A trial would be the only decent way of arriving at it. On car axles it has been found that roller bearings start with 1/4 the friction of oil bearings and at ten miles per hour show but half the bearing friction. Size of axle in this case 31/2 inches. If your shafts can not spring and so positively get a bearing the whole length, your losses will be much less than if they spring and bind. Probably 5 per cent is a safe figure for you under best conditions.

To prevent noise from push rods and springs requires attention to every detail. The cams should be made so as to approach the roller easily and after forcing it up enough to get the valve off the seat should abruptly throw the valve wide open. The abutting ends of the stem and push rod can be enlarged and tipped with hard fiber or sole leather set to the enlarged ends. This will wear down but can be adjusted of course. The distance between these ends should be kept very slight when hot, for this lessens the noise. The long wire which forms the body of the usual helical spring will give a musical ring when struck and adds much to the noise. The use of shear springs is lighter and avoids this ringing. I do not think there is any noticeable difference between air and water cooled engines in the matter of noise if both are alike otherwise. But flanges which vibrate like a bell are not conductive to silence of course. And many air cooled engines are not muffled as are the water cooled ones. But some are quiet and this

proves that air cooled engines can be quiet.

To braze a tube with stub in it put the flux in the joints before putting together and put plenty of brass and flux inside. It will run out through the joints when the stub is properly hot if the stub end is held low.—C. E. D.

OFFSET CRANK-SHAFTS

[418.] Will you please send me the names of firms manufacturing gasoline motors with offset crank-shafts?

GLOVERSVILLE, N. Y. CHAS. E. PANNACI. The supplement to the April issue shows more than thirty different makes of vehicles having offset engines and gives in most cases the amount of the offset. This practice bids fair to become universal. I could not awake any interest in it when I introduced it in 1898 and often wondered it up.—C. E. D.

2-Cycle Engines

HUGH DOLNAR.

Questions will not be answered in this department unless the inquirer gives his name and address. The name and address will not be published if so requested. Put name and address on all drawings. When possible fold drawings and mall in envelope with the description.

DIAPHRAGM GASOLINE PUMP

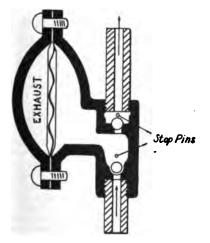
[351.] I wish to use a diaphragm pump, worked by the exhaust of a 2-cycle motor, to raise gasoline to the carburetor.

What shall the diaphragm be made of and how should the pump be constructed?

HART, MICH.

W. G. PALMER.

I should expect very unsatisfactory results from an exhaust worked diaphragm of very thin copper, corrugated, say 3 ins.



AUTOMOBILE TRADE JOURNAL

Suggestions for disphragm gasolene pump, exhaust operated dia., with hot exhaust on one side and gasoline on the other side of the diaphragm. If you want to try it, the illustration will give you an idea of construction. Such a pump has been used for jacket water circulation, but in the in-

stance observed by me was abandoned in favor of a plunger pump.

Such a construction as you propose will not do at all.—H. D.

POPPET VALVE IN 2-CYCLE PISTON HEAD

[415.] Referring to page 205, March number, 1909, last paragraph of reply by C. E. D. to question No. 323: As a reader of your Journal I am interested in this paragraph which states that Mr. C. E. D. obtains best results on 2-cycle engines of base-compression type by supplying charge to cylinder through a large diameter lightweight check valve in the head of the piston, conical deflector over valve being employed to shoot the gas in a central stream to the head of the compression space.

I am endeavoring to design a small two-cycle engine which is required to operate strongly at speeds from 300 to 2000 R. P. M., suitable fly-wheel being provided for satisfaction at low speeds. I desire to port the exhaust all around the cylinder (except ring bridges) to provide very free exhaust, and to use check admission through the piston head as described above for symmetrical inlet. Inertia troubles at high speed would seem to prohibit the piston check valve. The data and my reasoning are as follows:

Cylinder diameter and stroke, 3 ins.; length of connecting rod, 8.75 ins.; depth of exhaust port, 5/6 in.; area of exhaust port, 4 sq. ins.; diameter of check valve in piston head, 2 ins.; weight of check valve complete, 1-5 lb. Speed assumed in calculation below is 2000 R. P. M.

I have carefully laid out the actual piston positions for each 10 degrees of crankpin position, and have calculated therefrom the piston velocity at 2000 R. P. M. for each 10 degrees crank position. When the piston commences to uncover the exhaust port, % in. from the bottom of the stroke, the crank pin is about 60 degrees from the lower centre. Assuming the exhaust completed sufficiently to permit admission through the check valve by the time the piston is ¼ in. from the bottom of the stroke or the crank 30 degrees from the lower centre, the piston check would then be opened by base pressure.

At 35 degrees crank position the piston velocity at 2000 R. P. M. is 13.5 ft. per sec., and at 25 degrees position it is 9.4 ft. per sec. The decrease in velocity during this 10 degrees crank movement is 13.5-9.4=3.1 ft. per sec. The time in which the crank at 2000 R. P. M. moves 10 degrees is 1-1200 sec. Hence at 30 degrees position the piston and its check valve are slowing down at the rate of or have a negative acceleration of $\frac{3.1}{1,1200}$ -3720 ft per sec., per sec.

The force due to excess of base pressure over cylinder pressure at this instant must stop the check valve while the piston completes its downward stroke. The necessary force neglecting frictions and assuming no valve spring is $F-\frac{Wa}{32.2}$ pds. where W- weight of valve in pounds, a-acceleration of valve in ft. per sec., per sec., and 32 2-acceleration constant due to gravity. Hence $F-\frac{1/5x3720}{32.2}$ =23.1 pds. or $\frac{23.1}{1/5}$ =115.5 times the walve, surely a surprising figure, but quite correct.

The valve is 2 ins. in diameter and thus has an area of 3.14 sq. ins. Hence the excess of base pressure over cylinder pressure on the valve necessary to stop the valve and permit admission is at least $\frac{23.1}{3.14}$ =7.85 pds. per sq. in. If it be assumed that the 3/8 in exhaust owning corresponding to the 30 degree crank position would at 2000 R. P. M. reduce the cylinder pressure to about 3 pds. per sq. in. the base pressure with the piston ¼ in. from the bottom of its stroke would have to be at least 10.35 pds. per sq. in. With my design it is not difficult to fill the waste space in the base to attain this pressure.

Questions: (1) The opening of the valve as above calculated does not seem impossible, but as the piston starts up on the compression stroke, it will hit that valve a 23 pd. blow 2000 times a minute in closing it. Is it possible for a nickelsteel valve of slightly conical form for strength and stiffness to stand such punishment? (2) Is such a valve inside the engine quiet or noisy? (3) Would the oil from the base lubricate it properly and also cushion the shock of closing to any extent? (4) Would better results be obtained by a well designed admission port

in the cylinder wall, although it involves large reduction in exhaust port area? (5) Is a spring necessary to assist in closing the valve? The piston motion and gas pressures seem to me to be entirely sufficient. (6) Are the exhaust valve dimensions correct for use with check valve in the piston head?

TORONTO, CANADA.

H. W. PRICE.

You seem to grasp the problem quite well, but you are not looking out for all the needful features. A 2-in, inlet check is much larger than you need in so small a cylinder as 3-in. bore and stroke. Next, cut the weight. You can make that valve so light and with stem so short that it need only weigh half the weight you have given it. This can be done without reducing the diameter and it will of course reduce the base pressure needed. It also reduces that "hit" you inquire about. In this form of engine I find it unnecessary to open the exhaust ports so early as with the transfer passage. This means that the retardation of the piston and its effect on the valve is less than you have calculated. Likewise the base pressure can hold that valve open till the exhaust port has nearly or quite closed. This allows more time for the charge to get into the cylinder and offers less chance for it to get out while the exhaust port is closing; one contributing to fuller charges and the other to less loss through the exhaust. If you make the lift of this valve very short the noise cannot be heard and the punishment is very slight. Oil does lubricate and cushion it. At the time the paragraph quoted here was written the piston check valve type had given better results than the side admission port form. Since that date some progress has evened them up, but the matter of superiority has not been decided, perhaps never will be. Many things are good in some points and bad in others. The piston valve looks best to me, but I am using mostly the other type for the present. With a vertical engine a spring is not necessary, but it is advisable. There seems to be some backfiring if a spring is not used. I interpret this to mean that sometimes the valve opens early enough to let in the charge before dead centre and at that point the valve is full open and does not close quick enough to prevent flame propagation through the opening. With a spring there is always a certain gas pressure and speed needed to keep the valve open and this speed, if greater than the rate of flame travel, will not let any back-fires occur. Forty-five degrees is early enough opening for the exhaust port in this type of engine. This is one of the advantages of this type. The valve will open as soon as the pressure allows it to do so and will remain open till most of the new charge gets in, even though at that time the exhaust port is practically ready to close. I think you can use smaller exhaust ports.

Your method of figuring the valve motion is too deep for me. You give probably correctly, a maximum valve speed at 35 degrees of 13.5 ft. per second. This is less than the speed it would acquire in falling one second. The energy in that valve would be its weight multiplied by the square of its velocity and divided by 64.4 We will probably not agree on this, but I simply wish to bring out the fact that l consider the inertia of the valve much less than you think. I have not taken time to check up your figures. But I do not believe the punishment you assume could be taken by the valve, nor do I believe it exists. Make the valve motion quite short. Gas will get through a short passage with surprising rapidity. And the chance to hammer is much reduced.-C. E. D.

BUILDING 2-CYCLE CAR FOR DESERT

[352.] I am building a car for my own use here on the desert and want it as light and strong as possible and with about 25 or 30 H. P., and I would like to install a 3-cylinder, 2-cycle, air-cooled motor, but not being familiar with the 2-cycle aircooled motor, I would like you to give me a little advice on the subject as to which style of motor and make and where I can get same.

(1) Would you advise air-cooled motor for this dry, hot country, it being hard to keep a water-cooled engine cool here?

(2) If water-cooled, would you not recommend gravity instead of a pump for 2cycle engine?

(3) What air-cooled 2-cycle suits your

ideas best for my purpose?

The Atlas people claim they have the best 2-cycle motor made. The Speedwell claims the same thing, and according to the Scientific American, the Elmore engine has great advantages over all others, but in the March issue of 1908 Cycle and Automobile Trade Journal you give quite an item about the Euclid Motor Car Co., of Cleveland, Ohio, which uses the Palmer 2-cycle engine and for a water-cooled 2-cycle it suits my ideas better than anything I have seen or read about, as it does away with crank-box pressure, which looks good to me, as felt packing and all kinds of bearings will wear, no matter how well built, more than piston rings, which means a waste in both fuel and power by leaking through main bearings.

(4) What size bore and stroke would you consider about right for a 25 to 30 H. P. motor running at say 1200 to 1500 R. P. M.,

3-cylinder, 2-cycle?

(5) Would you advise friction drive for a 25 or 30 H. P. motor driving a car weighing 1500 to 1800 pounds? If so, what size should diameter disc and friction pulley be and how wide a face should friction pulley have?

E. L. MUDGETT. BARSTON, COL.

(1) I fully believe it possible to build a satisfactory air-cooled, 2-cycle motor, and I rode on a Page car, built at Adrian, Mich., which had 4 cylinders, 2-cycle, aircooled, copper rings for cooling fins, very thin, and corrugated, and set into the cylinder mould and the copper cooling flanges fixed in the cylinders by pouring the melted iron around them at the joining with the cylinder. This Page motor had no fan at all, was flexible, cooled well and made an excellent showing. The Page Company has not proceeded with this car and will not give out any story for publication. This is the only air-cooled, 2-cycle motor I ever saw which cooled well. I cannot advise you for or against air-cooled, 2-cycle motors, as I have not seen enough of aircooled, 2-cycle motor performance to assert any decided opinion in this matter.

(2) I believe thermal circulation much better than pump circulation of cooling

(3) I do not know where you can procure such a 2-cycle, air-cooled motor as you desire.

The first Euclid motor did not cool well. I believe Mr. Palmer is now working on a second air-cooled motor at Trenton, N. J.

Without a doubt there are many valid objections to crank-box cylinder supply. yet the broad fact stands that the Atlas, the Elmore, the Speedwell and the American Simplex, Mishawaka, Indiana, are all putting out cars with 2-cycle motors, crank-box cylinder supply, which are sold and satisfy purchasers.

(4) Three cylinders, 4 x 4, will give you what you want, if you can fill the cylinders

at maximum charge.

(5) There are several cars on the market which make very successful use of the friction drive. The disk 18 or 20 ins. dia., paper wheel same, with 1% paper wheel face, are the ordinary dimensions. See the 1909 Cartercar story in this issue of the Journal.

You might write to Dr. W. P. Agnew, 203 Telegraph avenue, Oakland, Cal., about internally air-cooled, 2-cylinder motors, and write to Perry Okey, Columbus, Ohio, about 2-cycle motors, water-cooled. think Okey can supply you with a very good 3-cylinder, 2-cycle, water-cooled motor.-H. D.

2-CYCLE SCAVENGING FAN, STEEL PISTONS AND FUEL INJECTION

[405.] Kindly reply to the following three questions through the medium of the Journal:

- (a) Can a fan be used successfully, instead of a displacer cylinder or crank case displacer, in a two-cycle engine as a method of introducing the charge into the cylin-
- (b) Can steel pistons be used satisfactorily in steel cylinders. Has this ever been tried and by whom. (I understand the objection to steel cylinders with cast iron pistons, and the reverse practice.)

(c) Who manufacture pumps suitable for the direct introduction of liquid fuel into the cylinder of internal combustion engines.

ST. LOUIS, MO.

AMEDEE V. REYBURN, JR.

Replying to your three questions:

(a) Yes, with many qualifications. If a carbureter is used and the fan handles only air mixed with fuel, then it is clear that some means must be supplied to avoid waste of fuel by passing the surplus of an over-charge through the intake-port out through the exhaust-port, and, obviously, the fan must be placed between the carbureter and the cylinder intake port.

The fan may be belt-driven or geardriven or motor-exhaust-driven, and the fan-shaft may be in plain bearings or in ball bearings, and in any case or form the fan will be found to have plenty of objectionable features of its own.

C. P. Malcolm was the first, so far as I know, to use two fans in separate casings on one shaft with a fly-wheel and drive this shaft by causing the exhaust to impinge the vanes of the driving fan to give the two fans and the fly-wheel a high velocity to be maintained by the fly-wheel, so that the second fan could draw a large volume of pure air through the intake port, the cylinder and the exhaust, while the intake port was uncovered by the piston and then force this air through the exhaust pipe and the muffler into the atmosphere. plan of course requires injection of fuel in liquid or spray or vaporized form, and this fuel injection must be late; just before the intake port closes, so that air charged with fuel will not be drawn out of the exhaust port. This plan of Malcolm's was used by him successfully, and he believed it very valuable. It is obvious, however, that since the intake port closes before the exhaust port closes, the fan sucking the exhaust port must reduce the cylinder charge to below atmospheric pressure at the time of exhaust port closing.

With a pure air charge and fuel injected at the intake port, fuel injection must precede intake port closing to mix to the fuel with the body of the charge in the cylinder, so that the fuel will surround the spark plug when the charge is compressed.

It is clear that the cylinder-sucking fan cannot become beneficially operative until after the intake port is opened by descent of the piston, if the charge has access to the cylinder through the intake port, or dinary low position, only. But suppose an automatic intake valve opening into the cylinder is placed in the cylinder-head and that a fan sucks the exhaust port; suppose, also that the cylinder-head is thickly set with vertical cooling spines under a flat cover touching the spines top-ends; then, if the fan were efficient, a large volume of

cold air would be sucked from the outside cooling the head-spines, and would then pass downward and out through the exhaust port, cooling the cylinder exhaust side, and with this arrangement fuel could be injected close to the spark plug in the cylinder head just as the exhaust port closed, so that the rich charge would lie around the spark plug and make ignition sure, with pure air below the charge to give oxygen for charge burning. seems to me to be the best possible arrangement for fan cylinder charging, no low intake port, an automatic intake valve in the cylinder head and the fan sucking the low exhaust port opened by piston descent

Although not asked, I volunteer the opinion that fan charging is more costly, less reliable and less durable than charging by a separate cylinder and piston. also give notice that I am, so far as I know, the original inventor of this here described form of fan-supplied 2-cycle motor and may apply for patent therefor. (b) Without doubt steel pistons have been used in steel cylinders of small motors, and, if given abundant lubrication, they probably work well. But the form of piston and piston seat demanded by the Frank engine are against a drawn steel piston and in favor of a grey iron or steel casting piston.

(c) It is no trick at all to make little plunger pumps for fuel charging. I do not know where you can buy such pumps. I do not believe fuel injection into the compressed charge can be satisfactory. It is an easy thing to make a pump to discharge a variable quantity of fuel into the cylinder at atmospheric pressure or a little below.—H. D.

A CORRECTION IN 2-CYCLE H. P.

The writer has often mentioned the first "American Simplex" motor, 2-cycle, 2 cylinders, as showing over 40 H. P. with a muffier and over 50 H. P. without a muffier, which was and is the fact, giving the cylinder bore and piston stroke as 5 ins. each, which was an error, the cylinder bore being 5½ ins. with the 5 ins. piston stroke as stated. This error made the proportion between the actual piston area and the stated area as 30½ is to 25, giving the piston area at about five-sixths of what it really was.

But with 5½ ins. piston diameter the power, 20 H. P. with muffler and 25 H. P. without muffler, was the highest so far brought to the writer's notice for 2-cycle and crank-box pressure cylinder supply. The port particulars of this motor, which is now in service, driving cars, were, first, intake port top line ½ above low piston head and top line of exhaust port 1¼ ins. above low piston head, afterward changed

to exhaust port top line 1½ ins. above low piston head. The intake-port had three bridges, making four intake port segments each 1½ ins. circumferential length, a total intake port length of 4½ ins. The exhaust port had one bridge, dividing it into 2 segments, each 1½ ins. circumferential extent, 3½ ins. total exhaust port circumferential length. Because of two more bridges the intake friction was greater than the exhaust friction with only one bridge, so that the 1½ ins. excess intake port length does not give so much more capacity than that of the exhaust port as seems probable at first sight.

The compression was 60 lbs., cylinders full of pure air, crank-shaft turned slowly to make compression stroke. With crank-shaft at 500 R. P. M. the recording gauge showed 85 lbs. compression, full cylinder

charge of pure air.

This 2-cylinder motor with ports as specified was strong at 1800 R. P. M., and showed, maximum, 51 B. H. P. without a muffler and 41 B. H. P. with muffler, against Prony brake resistance, brake drum water-cooled, wood-strip brake-band facing, making 5-minute runs possible without burning the wood facing of the brake band.

These are the highest well authenticated powers obtained from two 5½ x 5 2-cycle, water-cooled cylinders, within the writer's knowledge.

ANOTHER REVOLVING 2-CYCLE ENGINE BUILDER

For some years I have been studying the two cycle motor and the result of my research I am sending under separate cover to you. My object was to design a motor of light weight, air cooled, without a crank and of abundant power for its size. Any style of cylinder can be used with the design. When using other styles such as the two-port etc., the gas is drawn in through a hollow piston rod. To make an extremely light weight motor the charge goes through a piston valve in the piston and exhausts through a valve in the head. All valves are mechanically operated. I use a trip to close the exhaust valve. The motor is of the revolving type. PLYMOUTH, MASS.

PLYMOUTH, MASS.

G. R. BARTLETT.
There are several features of interest in your designs but in general they are not practical. The idea of feeding a reciprocating engine through the connecting rod is very old. It has little to commend it. There are usually better ways to introduce the fresh charge. The use of valves through the piston head is also old as is the use of the piston to bump open the exhaust valve.

Your peculiar arrangement of hollow shaft, eccentric instead of crank and cylinder and piston both moving, with a piston rod through the center of the firing chamber, does not look good. Doubtless such a device would work if properly car-

ried out but what is the use? The world is looking for something better than what now exists. Your altruism in making known what you have is commendable. If you can not use it yourself maybe some one else can. But confine yourself to few things and thresh them out to a finish. It is really surprisng how simple things can be made if one puzzles over them long enough.—C. E. D.

2-CYCLE ENGINE QUESTIONS

[426] I would like to know a few things about 2-cycle engines.

Why should there be only one-half more power in a 2-cycle with double as many explosions. Is the other half wasted, perhaps, part of the new charge escaping through the exhaust port, for the 2-cycle engine uses about the same amount of gasoline as other 4-cycle engines with 4cylinders, same bore and stroke. If this is correct then the 2-cycle is inferior to a 4-cycle, for using the same amount of fuel and giving only ¾ the power would be rather expensive and undesirable. also see in the atlas auto catalogue the claim made, that a 2-cycle would give from 40 to 60 per cent. more power than a 4-cycle, or in other words there would be from 40 to 60 per cent. waste in a 2-cycle, for if one cylinder gives two impulses to the other one, only one size being the same, it ought to give fully 100 per cent. more, anything less would be a waste. In another leaflet it says a good 2-cycle can give more than "double" the power of a 4-cycle, at same size. In regard to lubrication, mixing oil with the fuel, the atlas folks say is wasteful, and they also claim that air cooling is impossible with a 2cycle, as the explosions are twice as often, and should be sure to get too hot. GEO. WILL

UPPER SANDUSKY, O. GEO. WILL. Your questions are on lines that seem hazy in the minds of many. The answers have already been given in many forms but will have to be given many more times before they are grasped by the public at large. The first thing to remember is that very few 2-cycle engines take in twice the mixture that a 4-cycle of same size does.

It is common to assume that they do, but they do not. If the 4-cycle had no clearance space it would act like a splendid pump in taking in the new charge. It has some clearance and the gas in this space is expanded or stretched out as the piston starts to draw in more. Then the new charge stretches out and as a result the total contents of the cylinder at the end of the suction stroke does not fill the total space at atmospheric pressure. There are some things which modify this statement but this is in general true. Thus if the cylinder walls are hot enough to warm up this charge while the crank passes dead center the indicator may show atmospheric pressure before the piston starts back. Or by holding the valve open late the gas

in the supply pipe may continue to flow and may ram into the cylinder quite a little more than was actually sucked in by the piston. But in ordinary practice there is less than a cylinder full. In the two cycle the matter is worse. The first movement of the piston draws old gas back from the cylinder or perhaps it is the last of the new just transferred. At any rate it can not draw in new till the transfer port is closed. Thus is lost 30 degrees of the crank movement. Then further piston movement begins to stretch or expand the gas in the case till the inlet check valve or the disk valve is opened. After this the new charge is acted upon but this action is very feeble as compared with the action of the 4-cycle. You can understand the two by comparing an attempt to lift a weight with a short rubber band and also with a long one. The clearance in the 4-cycle is about 1/4 the piston displacement. In the 2-cycle the crank case content is two or three times the displacement. The difference in ability to pull in a full new charge is probably ten to one. I have seen it stated that at high speeds a fourcycle engine probably gets not over half charges. If this is true, it is wonderful that the two-cycle gets enough to run. I think this is sufficient to show you that the two-cycle does not put on the new charge for its full piston stroke and does not effectively pull as does the four-cycle during any part of its stroke. It therefore does not take in the amount supposed and so should not be expected to give double power. Further the four-cycle begins to compress as soon as the piston starts back, if the valve is closed. The two-cycle can not begin till the exhaust port is closed which is about 50 degrees crank movement later than the four-cycle. This means that about ¼ of the total cylinder content has been expelled through the exhaust before the cylinder is closed and compression begins. Now sometimes this is loss and sometimes not. If it is possible to so put the new charge into the cylinder that the old gases are down at the port end, this explosion crowds them out and leaves clean and powerful mixture in the cylinder for work. But if the old gases are up in the top and fresh mixture is down in the port region, this is sure to go out and be This is why it is of great importance to have proper deflectors and head shapes. And to get that arrangement which will give the best result at all speeds is next to impossible. This explains why so many 2-cycles have been wasteful and condemned. But good and economic 2-cycles have been made and one good one is enough. It proves that the thing can be done. From the above you will see that a 2-cycle should not be expected to give double power because it does not get in double the quantity of mixture at high speeds. Some special forms do. But it does one thing of great advantage: As it is pulled down in speed

under hard work it takes in a larger proportion of new charge and so fills the cylinder better. This explains why the 2cycle is such a good puller at low and moderate speeds. This is a feature much desired in auto work because bad roads cannot be driven over fast so the motor must be able to pull at low speed or the gears must be changed. Further, the usual auto engine is seldom run at full speed and wide open throttle, but is so large that it has much excess power and so runs at probably half power most of the time. This reduces the compression and the efficiency in a 4-cycle, but since any loss of charge from the crank-case is made up by retention of old charge in the cylinder, there is always practically a constant compression in the 2-cycle with corresponding high efficiency. The large proportion of old gases is likely to cause misfires, but a large spark will prevent most of these.

Mixing oil with the fuel is certainly the best way yet found for a 2-cycle. No more regular way of feeding the oil can be found. It oils according to the power developed. This permits the highest econ-

omv-

Air cooling is a peculiar problem. Many things enter into the successful air cooler. But these things are just as essential in the 4-cycle as in the 2-cycle. In fact, I think the 2-cycle probably has the advantage. High compression increases the efficiency because more of the heat goes into pressure and less into the cylinder The 2-cycle always has its full walls. compression and is not heated up by half pressure, and consequently slow burning charges. The 2-cycle exhaust usually opens earlier than the valve of the 2-cycle, and so gets out the main heat sooner, and having no hot valve in the head, this delicate end of the cylinder does not suffer so much as it does in the 4-cycle. It fires twice as often, but only retains each charge half as long so the result is about equal.—C. E. D.

TWO-CYCLE FUEL INJECTION DISCUSSION

[428.] Having a few ideas concerning 2-cycle motors, I submit them to you for your opinion on same. I have an idea in my mind for a 2-cycle motor in which the fuel is injected by plunger pump, consisting of only three moving parts to each cylinder. The quantity of fuel will be varied by increasing and decreasing the length of pump stroke. Do you think this is a good method of supplying fuel to motors? My idea is that there is no fuel wasted through the bearings as occurs in all motors using crank case compression. cam or wheels will be used to operate pump. The fuel will be injected while the piston is traveling upward in the motor. Do you think it a better plan to inject the full charge, instantly after the piston has closed the ports? If I use this latter method I will be compelled to use a cam to

obtain this instantaneous action. It will also permit me to place the pump near the lower end of cylinder, where the power of the explosion will not be exerted on the fuel inlet as would occur if pump was placed on compression space of motor and the fuel injected gradually as the piston travels upward in cylinder. Which do you consider the best place to place pump in compression space or on lower end of cylinder? The motor is to be air-cooled. My method of scavenging the cylinder is assisted by a rotary blower, similar to those used on blacksmiths' forges. It will be driven from forward end of motor through a short shaft. The air pipe will be connected to inlet ports of cylinders, and will be supposed to fill the cylinders with pure air in excess to their demand so as to partly internal air cool the cylinder, as mentioned by H. D. in Cycle and Automobile Trade Journal of March 1. 1908, page 190. Do you think this method will supply the necessary amount of air providing the piston is sloped towards the outlet port, or will the burnt charge tend to come out of inlet port caused by insufficient air resistance as in starting when the blower would not be furnishing much air? My reason for using the blower is to avoid crank-case compression, allowing me to use ball bearings on crank-shaft.

GHENT, N. Y.

HARRISON M. RAAB.

The pump method has been tried many times and some folks seem to get fine results out of it. My own experience is that it is very delicate. Also that it does not allow the necessary time for vaporization and so is likely to send unburned or partly burned fuel out in the exhaust and so wasteful than a carburetor more method. I have used both injection points. There is very little choice. I think I favor the earliest injection because of the longer time to perfectly mix. The blower idea is also not a new one. There is no objection to this except the extra parts. If your ports are right height the exhaust will get out without blowing back, and this action is more certain at low speeds than at high because the interval between the opening of the two ports is greater. high speeds the inlet opens so quickly after the exhaust that sometimes the gases blow out the inlet port. I favor the crankcase compression. This adds no parts and works quite well. By a little experimenting you can ram in some air and so nearly or quite fill the case. It allows time for the charge of fuel to mix with the air and you can use stuffing boxes at less cost than a blower and thus use the ball bearings if desired. But the saving in friction will not be nearly so great as the loss of power driving a blower, so why use ball bearings? It seems to me that in an engine where lubrication must be maintained and dirt excluded, ball bearings are an unadvisable refinement, not worth their additional cost. There is a gain in power if the cylinder can be completely washed out with pure air, but if this gain is to be had at the cost of a blower and its troubles, I would prefer making the engine a little larger and getting the increase in power that way. I think you can get economy with less trouble by providing a gaseous mixture rather than by pumping liquid.—C. E. D.

WRITE THE MAKERS

[348.] Kindly give me a little advice on the following: I have a 4-cylinder, 2-cycle Elmore of 1907 which, after having cranked engine and gotten it started running idle, back-fires out of air shutter in carburetor, sounding like pistol shots. Sometimes while running on the road it back-fires now and then, but when engine gets warmed up good this back-firing stops even when running idle.

The engine lately had new piston rings put in.

Any advice you can give me in the columns of The Cycle and Automobile Trade Journal will be gratefully appreciated. CHICAGO, ILL.

In matters relating to a car and motor in regular and successful use, like the Elmore, the better course is to address the manufacturer directly, as the manufacturer is certain to be able to give better advice than any outsider.

Your troubles do not appear to be at all serious, and the Elmore factory can undoubtedly advise you understandingly.—
H. D.

NO OPPOSED CYLINDER 2-CYCLE MOTORS

[419.] I write for your opinion on 2cycle opposed cylinder motors for small cars, advantages and disadvantages. Have followed the discussions in the Journal closely, but the opposed cylinder type seems to be ignored. The one made by the Federal Company is the only one noted. The Elmore ran their's in pairs, horizontally, and so does Duryea, but all others are vertical. For ease in examining crank case interior and pistons, there can be but little doubt of the superiority of the horizontal, and there must be some strong reason in favor of the vertical, or, it seems to me, the opposed type would prevail. Can you give me the names of manufacturers of the opposed type?

SOUTH BEND, IND. MORTON WAGNER.

Almost all 2-cycle motors to date have used crank-box cylinder supply, which calls for least possible crank-box clearance, which is not very easy to obtain with opposed cylinders. Vertical cylinders lend themselves readily to the individual crank-box, and the torque with a pair of 2-cycle cylinders, placed side by side, is the same as if they were opposed. The vertical form has the preference. I cannot give you the name of a maker of an opposed cylinder 2-cycle motor.—H. D.

Opinions and Suggestions

Under the above heading we will be pleased to publish letters from our readers expressing opinions, stating bow they have overcome difficulties, or making useful suggestions. In this department will also be published longer communications or articles, of either a general or technical nature.

COMMUNICATION—WHY A LATE SPARK CAUSES OVERHEAT-ING

Referring to 341, p. 121, April issue, and to 396, p. 88, May issue, I ask, does a late spark cause heating? I claim the opposite a late spark keeps the engine cooler. Let us verify our statement! Try this experiment: Take your car. Open the throttle a certain amount, say one-fourth. Retard the spark. Run your car 30 minutes. Feel your cylinder. It is relatively cool and you used a late spark. Now let your engine cool off. Use fresh water in radiator. Open again your throttle the exact amount (i. e.) one-fourth. Run your car 30 minutes, using an advance spark. Feel your cylinder. It is hot, much hotter than before. In this case an early spark was Now haven't we disproved the above assertion? A late spark will heat the cylinder more than an early spark, only in the case where approximately the same speed is kept up. The explanation of it is as follows: An engine will develop its greatest or maximum power when the spark occurs at the correct time, which is exactly at the dead centre, or perhaps a fraction of a second of time previous if engine runs very fast. Now any retardation of spark will cause a drop in speed of car; and in order to keep up speed the operator is compelled to open the throttle the wider, in order to allow a greater amount of fuel to enter, caused by a waste of energy due to the late spark. For each retarding of the spark there must be a corresponding wider opening of the throttle, if the speed is to be kept up. At the end of a certain time the operator will find his engine much hotter, than it would be, had he used an early spark. Disregarding the difference in radiation between a blue and yellow or red flame, and disregarding the difference in amount of radiating surface exposed, the engine is hotter, because on account of a later spark it was necessary to use a much larger charge, a larger amount of fuel used, produces more heat; and a larger amount of heat makes the engine hotter. A spark at the correct time would have propelled the car over the same distance in the same time with much less fuel, and the production of less heat. Hence would have kept the engine cooler. In our first experiment the engine was run thirty minutes regardless of speed and space. The total number of charges, although a little heavier-was much less when spark was retarded, hence the engine was necessarily cooler. I hope this explanation will satisfy the reader.

SEGUIN, TEXAS.

C. F. BLUMBERG.

COMMUNICATION,—LUBRICATING OILS AND CARBURIZATION

I have always held to the theory that the carbon deposits taken from gasoline engines were due to the incomplete combustion of lubricating oil and gasoline used. I have just demonstrated by an experiment noted below that this is a fact.

I placed in a small steel crucible, a handful of scrapings taken from the cylinders and piston head of a gasoline engine. I kept the crucible at a cherry-red heat for the better part of an hour, and at the end of that time I found a residue which proved to be purely iron and nothing else.

This experiment proves beyond any sort of question two things: First, that inefficient lubrication produces undue wear, as shown by the considerable percentage of iron, and that, secondly, hydro-carbon not pure carbon, is due to imperfect combustion. If the combustion had been complete, as it was in the crucible, no deposits whatever would be left.

It also proves a fact that I have always contended for, and one which applies equally to gasoline and lubricating oils, that the more combustible an oil is, the less will be the deposits of hydro-carbon. When applied to gasoline it means that the higher the gravity the more perfect the combustion, the less smoke, therefore the less carbon. As applied to lubricating oils, the same theory is equally true, the higher the gravity and the poorer the fire test, that is to say, the more combustible, and the lower the viscosity, the less carbon, under the same condition will be deposited, and incidentally, the poorer the lubrication. On the contrary, the higher the viscosity or consistency, the better the lubrication, the more efficient the compression or the better packing for the rings and the greater the deposit for the reason stated above. The deposits of carbon are not due to any free carbon that the oil may possibly contain, but are due entirely to partial combustion. This applies equally to gasoline and lubricating

There is no such thing, or ever will be, as a lubricating oil that will not carbonize, unless the heat is intense enough to produce absolute combustion, but there is a difference in the degree of carbonization. The oils advertised as non-carbonizing are all what we oil men call neutral oil, and the higher the fire test, viscosity and lubricating efficiency, the greater the percentage of carbonization, while, on the contrary, the higher the gravity, the poorer

the fire test and viscosity, and the less efficient the lubrication, and the less carbonization.

A blended oil with a still higher fire test and viscosity and a better lubrication gives some increase of carbonization. This means that a man who operates an automobile must choose between comparatively poor lubrication and undue wear with poor compression, and comparatively little carbonization, or a better oil and some increase in carbonization.

T. T. SOUTHWICK.

ACETYLENE CURE FOR WAYWARD TAIL LAMPS

Reference to tail light trouble, for the benefit of your readers. I wish to say that I removed the oil lamp from my tail light and with the use of an 1/3 in. pet cock and a brass plate to fit bottom of lamp I attached a 1/4 foot acetylene burner and connected this to pipes feeding head lights, since when I have had no trouble with extinguished or smoking tail lamp. An acetylene tail lamp should be a good seller.

MILLERSBURG, PA. W. DOUDEN. (Rose Mfg. Co., 929 Arch St., Phila., Pa., manufacture an acetylene tail lamp.—ED.)

Since publishing the statement in the Opinions and Suggestions Department, page 214, March issue, on the mileage of Mr. J. L. Martin, our attention has been called to the "Around the World Mileage" given by a set of Firestone tires on the truck of Mr. A. Goyert, of Greensburg, Ind. Mr. Goyert made sworn affidavit that the tires on the rear wheels made 25,520 miles each and those on the front wheels 31,000 miles. The tires have since been removed and one of them was exhibited by the Firestone Company at the Boston Show. The tire itself is worn down to the cross bars, but the base remains intact.

NOTES FOR THE NOVICE

Passing a thin piece of paper under the reed of a horn is about the easiest way to remove the dust.

If your oil lamps go out frequently while running, it may be that the draught holes in the cap are choked up by heavy deposits of carbon.

Never attempt to force spark plugs too tightly in hot cylinders or difficulty will be experienced later in any attempt to remove them.

Keep all oil or grease away from your tires. See that the garage floors are as clean as possible and wipe off oil from tires as soon as seen.

The greatest error made by autoists attempting to repair their machines is that of not properly locating the trouble before trying to remedy it.

Every once in a while go over the tire casing and pick out the bits of gravel or metal which are imbedded. Any small cuts should be filled with cement.

Valve springs, like other parts of a motor, will not remain the same for ever, after all methods have been tried and the motor still lacks its usual power, a new set of springs will usually remedy the trouble.

When fitting a speedometer or mileage indicator to a car, make sure that the gear which is mounted on one of the road wheels is exactly centred on the latter, or else the gears will wear quickly and will also be noisy.

Make sure that all connections of the mixture inlet pipe of a multi-cylinder engine are perfectly tight, or otherwise small quantities of extra air are liable to enter which will make the operation of starting the engine more difficult.

It is better to renew the whole set of ball bearings than to replace one broken ball. If the odd ball cannot be carefully gauged, it may be a trifle large, and must therefore bear most of the load, causing it to wear very rapidly.

If the carburetor drips when standing, the float valve should be examined. If pressing it shut stops the dripping, the float is too high. If the dripping persists, the valve leaks and must be ground to a fit, preferably using pumice stone, since emery 'is liable to imbed itself in the brass.

Start your machine in a straight line if possible, and do not twist around on your steering wheel before you get started. Not only the tires, but the steering mechanism as well, will suffer if this practice is continued. Do not run your motor car along in the car tracks, as this grinds down one edge of the tire.

A good way to make a nut that is too large to do for emergency service is by hammering one side of the nut until the round hole assumes an oval shape. In this manner the threads will take hold of the bolt on two sides and will maintain the part in position until a nut of suitable size can be procured.

When valves are to be ground it will be found worth while to tie a piece of strong cord to a piece of waste and push the latter into the cylinder. In the grinding operation if any of the abrasive should drop into the passages, the waste will prevent its finding its way to the interior of the cylinder, and it can be removed when the waste is withdrawn by means of the string.

Stiff valve springs may close the valves with so much force as to break the heads from the stems, or break the stems at the key slots. Springs too weak to hold the valves on the cams will make the engine weak at high speeds, and produce clattering owing to belated seating of the valves. It should be remembered that an excessively stiff spring, even if it does not injure the valve seat by constant hammering, is consuming power which could be better expended in driving the car.

MACHINE TOOLS

FOR THE MANUFACTURE OF

AUTOMOBILES

AND ACCESSORIES



We are Prepared to Furnish You with an Estimate for a Complete Equipment, or Necessary Additional Equipment, for the Economical Manufacture of Automobiles and Accessories.

KINDLY COMMUNICATE WITH THE AUTOMOBILE DEPARTMENT

PRATT & WHITNEY COMPANY
111 BROADWAY : : : NEW YORK

NEW MACHINE TOOLS

THE AMERICAN TOOL WORKS CO.'S 21-INCH BACK-GEARED CRANK SHAPER

The 21-inch back-geared crank shaper shown herewith is made by the American Tool Works Company, Cincinnati, Ohio,. This shaper has a 21½ inch stroke and a 9 inch down feed to head. The table travels 14½ inches vertically and 26½ inches horizontally. The stroke of ram is positive and has eight (8) rates of speed, ranging from 7.7 to 96 strokes per minute. The length of stroke may be changed without stopping the machine. The device for

length, feed screw having an adjustable graduated collar reading to .001 in. Has large tool post for using holders with inserted cutters and has tool steel tool post screw and tool steel serrated back plate. Table is of box form with three T-slots on both top and sides, cut from the solid, with ample allowance of metal around them. Is thoroughly braced internally and is readily detachable. The cross feed is variable and automatic with a range of .008 in. to .200 in. instantly obtainable while the machine is running, at slot head near top of column, conveniently operated and accurately set by the star knob shown.



The "American" 21-inch Back-Geared Crank Shaper.

positioning the stroke is located on the ram near the head and may be operated while the machine is running. A pointer on the ram traveling along an index shows the length of stroke as set. Rocker arm is extra heavy and thoroughly braced and gives to the ram practically a uniform rate of speed its entire stroke, also provides an exceedingly quick return. The machine is readily changed from single to back-geared through a convenient, self locking lever, and has a back-gear ratio of 24.3 to 1 which with the large cone pulley, gives it extraordinary power for taking heavy cuts. The head is operative at any angle within an arc of 100 degrees and has convenient and efficient locking device. Down slide is fitted with continuous taper gib having end screw adjustment, for taking up the wear. Down feed is of unusual

Is supplied with graduations and pointer either side of zero, reading from 1 to 25 notches, each notch representing .008 in. feed. Construction is such as to render unnecessary any adjustment of feeding mechanism due to change of position of rail. Feed is uniform as set regardless of position of rail. The feed is thrown in or out, also reversed through knob on large to afford protection. Feed rack is cut from bar steel. The vise is of heavy pattern with deep jaws faced with steel. Is clamped by four (4) bolts to swivel base. (graduated in degrees), which is exceptionally large, covering nearly the entire area of the table top and being clamped to same by four (4) bolts. Vise screw has bearing at both ends and is always in tension when holding the work.

Special attention has been paid to the thorough lubrication of all working parts Ram slides are provided with felt wipers feed gear. Feed gears are neatly covered Ram slides are oiled from the center where at both the front and center of the column. oil pockets are provided, from which felt wipers take their supply of oil and distribute same through oil grooves to the extreme ends of the slides, thus doing away with a multiplicity of oil holes to be attended to. An oil pocket is cast integral with the column at the rear, storing any waste of oil, which may be drawn off at any time through a pipe extending from rear of column. A large quantity of oil is stored in a pocket cast integral with arm, which, with suitable means of distribution, insures thorough lubrication of crank pin and sliding block in rocker arm.

NEW MULTIPLE SPINDLE DRILLING ATTACHMENT

The Francis Reed Company, of Worcester, Mass., has placed on the market a line of multiple spindle drilling attachments one style of which is shown herewith. These attachments are built to order only upon specifications, thus mak-



The "Reed" Multiple Spindle Drilling Attachment. ing it possible to fulfil almost any requirement. The field of work for these attachments is practically unlimited being applicable to any case where two or more holes are to be drilled in constant relation to each other, or any special work where quality is to be considered. When the holes to be drilled are far enough apart, drill chucks are fitted, as shown in the cut, but when the holes are close together

plain round sockets are fitted. Experience has shown that this attachment is not adapted for holes nearer than % of an inch from c. to c. A short light arm is attached to the case to hold the drills in a given position. The tendency toward rotation of the case is very slight. There is practically no strain on the case or arm, it being put on merely to insure steadiness. All bearings are made large and long, with suitable oil grooves.

"U. 8." BENCH DRILL & CYLINDER GRINDER

The accompanying cuts show two of the latest machines placed on the market by the United States Electrical Tool Co., for use in automobile factories, garages, etc. The cylinder grinder herewith shown is made in three different sizes. It will grind cylinders 4½ in., 9 in. and 18 in. deep.



The "U. S." Grinder for Automobile Cylinders. The speed on these grinders can be varied from 18,000 revolutions per minute to any speed desired. The grinder is fitted with an angle plate so that it can be bolted to the tool post rest of any lathe. The internal grinding attachment can be taken off and the grinder can be used with an emery wheel for grinding piston rings, valve stems and work of a similar character in a lathe. The bearings in this grinder are adjusted for wear and dust proof.



The "U. S." Portable Bench Drill.

The motors are wound for direct current, 110-220 volts or for alternating current of the same voltage, 60 cycle, 1, 2 or 3 phase.

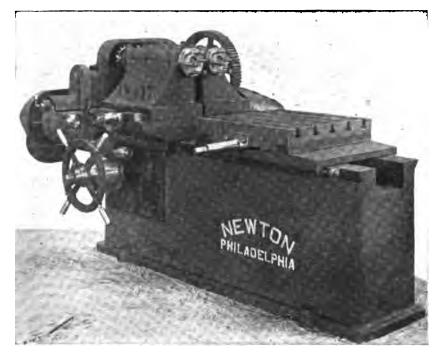
The bench drill will drill holes up to ½ inch in steel. The speed of this drill can be changed by moving a friction disc wheel backward and forward which changes the range of speed from 290 to 950. The motor used in this drill is pivoted and there is a spring placed under the back end of a motor to take up the wear on the friction wheel automatically. The motor is wound the same as the one used on the cylinder grinder.

THE "NEWTON" SPECIAL DOUBLE SPINDLE CYLINDER BORING MACHINE

The above cut illustrates the Special Double Spindle Cylinder Boring Machine, manufactured by the Newton Machine Tool Works, Twenty-fourth and Vine Streets, Philadelphia, Pennsylvania.

The spindles of this machine are 3 inches in diameter and revolve in brass bushed capped bearings, having a length over all in the head of 20 inches. The spindles are driven by means of steep lead bronze worm wheel and hardened steel

is arranged to have the boring bars bolted to the spindle by means of the four bolts shown to accommodate bars for boring open or closed end cylinders as desired. When open end cylinders are to be finished, it is convenient to use an outboard bearing. In boring cylinders in multiples of four or six it is a usual custom to bore alternate cylinders, adjusting the table for the different sets. The cylinders to be bored are attached to the face plate mounted on the table, usually having a pin or plain surface for location, eliminating extensive stock of fixtures and expense of boring bars.



View of the "Newton" special double spindle cylinder boring machine.

worm, both of which are arranged to revolve in oil for continual lubrication, through intermediate spur gearing by a cone giving four changes of speed. The large spur gear on the end of the worm shaft has a very heavy rim and acts as a fly wheel, giving a steady even drive to the spindles, eliminating chatter. The spindle heads have hand cross adjustment with micrometer adjustment and the adjacent faces of the heads have finished surfaces between which spacing blocks can be fitted to give the correct centre distances to the bore of the cylinder. The driving worms are made of sufficient length to permit of this adjustment. The work table is 24 inches square, has 14 inches of hand cross adjustment and the saddle has an in and out hand adjustment by means of the hand wheel and power feed of 14 inches. There are provided four changes of power feed taken directly from the end of the driving worm shaft. As illustrated this machine

THE "DEFIANCE" MOTOR FLY-WHEEL BALANCING MACHINE

The accompanying cut shows the No. 66 patent motor fly-wheel balancing machine manufactured by the Defiance Machine Works, Defiance, Ohio, for the purpose of securing a running balance to motor fly-wheels and other similar rotating parts of not exceeding 1,000 pounds in weight.

The frame is conical in form, in the centre of which is placed a vertical ground steel spindle standing in a step bearing in the base of the frame, and passing up through a long bearing at the top of the frame. This spindle at its upper end carries a face plate provided with two driving pins, which project upward parallel to the axis of the spindle. A steel centre with taper shank is fitted into the vertical spindle. Its upper end is reduced to a conical point and upon this rests the object to be balanced.

The vertical spindle is rotated by friction gearing driven by a horizontal shaft in suitable bearings at the base of the machine. This horizontal shaft is in two pieces, and they are connected by a friction clutch and moved longitudinally by a counter-weighted lever so arranged that the weight may be used to press the clutches together, when it is desired to rotate the object to be balanced, and to



The "Defiance" No. 66 Patent Motor Fly Wheel Balancing Machine.

disconnect the clutches when it is desired to examine, test and mark the object while running alone, as the driving pins are liable when pressing against the object to be balanced to produce uneven rotation. The true unbalanced condition is best shown when the disturbing influences of the motive power are withdrawn when the clutch is released. One horse-power is required to drive the machine. The floor space occupied is 36x60 inches.

UNDERWOOD AUTOMOBILE CYLINDER REBORING MACHINE

H. B. Underwood & Co., 1025 Hamilton street, Philadelphia, Pa., are manufacturing a machine for boring and reboring automobile cylinders. This machine, which is shown in the accompanying cut, operates in a vertical position, occupying but little space and requires only a 1 H. P. electric motor to drive it. The drive shaft meshes with a worm wheel revolving the cutting spindle, which has about 15 ins. of travel. The spindle is equipped with an adjustable head which is used to centre the cylinder and is then removed and the cutting tools substituted. The cutter-head consists of four tools set out equally by a taper in the centre, making it adjustable for any depth of cut required. The feed is automatic, variable and reversible, having a star wheel engaging one or more knockers to suit requirements.

The cylinder to be rebored rests upon three adjustable sliding blocks which are planed true and at right angles to the spindle. Clamps hold the cylinder in place after it has been centred, and as it rests upon the same face which is bolted to the

crank case, original alignment is assured. It is immaterial whether the cylinders are cast separately or together; they are rigidly held without distortion.



The Underwood automobile cylinder reboring machine

Inasmuch as most automobile cylinders are blind, it is only necessary to measure the length of cut required and note the travel needed on the spindle, which is graduated for this purpose. As the work is done in a vertical position, the chips fall out, do not clog the cutters or in any other way interfere with the work. The machine is easy to operate and as one cut is usually all that is required, the work can be done quickly.

The Auto Rebuilding Company of Chicago, is now located in its new factory at 1307-9 Wabash Ave., where they have about 25,000 sq. ft. of floor space. The ground floor will be devoted to rebuilding, painting and machine work and the floor above will be used for body making, blacksmithing, upholstering, wood working department, radiator making and all automobile sheet metal parts. At present this concern is working about 25 people but later on expect to have a force of about 50.



EDITORIAL

ADVANTAGES OF CARRYING A FULL Line of Parts

How often it happens that the owner sends to his dealer an urgency call for some part of his machine only to find that the dealer has none of these parts in stock, either because he does not carry them or is so neglectful that he has allowed himself to run short. The owner is often forced to wait for this part, trivial as it may be, until the dealer can obtain it from the manufacturer, his car in the meantime being laid on the shelf to his disgust and often great inconvenience. His neighbor thinks the car is no good because he knows that it is out of commission and everybody connected with the transaction is dissatisfied.

When a dealer or agent sells a car to a customer he is expected by that customer to virtually stand back of the car's performance and at least be ready to supply immediately the parts which are usually required to maintain the car in proper running order. The customer is in a measure dependent upon this dealer to this extent. Not being able to furnish such parts on short notice, is not only injurious to the reputation of the car, to the dealer's business, but also discredits the dealer as a business man and may at some future time cause him much more embarrassment than that caused by the dissatisfaction or loss of a few patrons.

Inability of the owner to obtain parts from his dealer has often lead to the purchase of such parts from jobbers or others in the immediate vicinity who might handle them. In this way jobbers who had no intention of encroaching on the field of the dealer, have been gradually lead into supplying the individual, thereby injuring the legitimate dealer.

The dealer who always maintains a complete line of parts for his particular make of cars, and is enabled to quickly supply any of his patrons at short notice and thus keep their cars on the road, is certainly laying at least one solid stone in the foundation of success. Satisfied customers have always been considered one of the strongest business assets a dealer could have, and there is very little question but

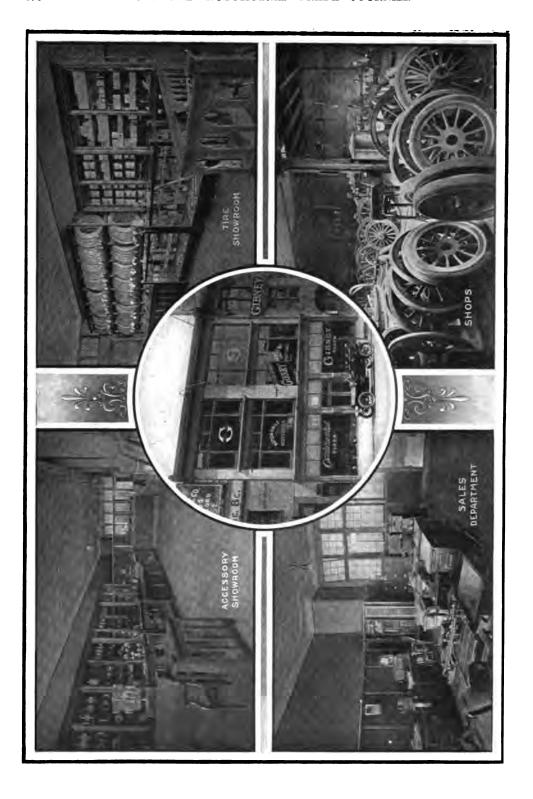
that ability to quickly supply parts is one of the pertinent factors in producing and keeping customers satisfied. There is probably nothing more distasteful to a car owner than to see the machine "hors de combat" simply for the lack of some small and apparently insignificant part. Every look at the machine makes him more disgusted and the fact that while the car is in the garage the weather is beautiful and after the part is received it is abominable does not tend to improve his opinion of the dealer who has been unable to supply him what was needed.

THE UNITED MANUFACTURERS

The United Manufacturers, which was recently organized, will act as a co-operative selling and distributing organization, handling the business of the Jones Speedometer, Inc., Weed Chain Tire Grip Co., C. A. Mezgar, Inc., Connecticut Telephone & Electric Co., and the N. Y. and N. J. Lubri-They have established branch cant Co. offices and distributing centres in Chicago, at 1430 Michigan avenue; Detroit, 225 Jefferson avenue; Cleveland, 1932 Euclid avenue; Philadelphia, 422 Commerce street, and Boston, 109 Massachusetts avenue. The home office is at Broad and Seventysixth street, New York City. The officers of the new organization are: President, W. B. Lasher, of the Weed Chain Tire Grip Co.; Vice-President, R. M. Owen, of C. A. Mezgar, Inc.; Secretary, Robert H. Montgomery, of New York, and Treasurer, George L. Holmes, of Jones Speedometer.

The objects of the new organization are to concentrate the selling efforts of the interested companies and to reduce the expenses of selling and distributing. On account of the branch house system, it will bring the selling company in closer touch with its customers. The new corporation does no retail business, concerning itself solely with the jobber and dealer.

J. H. Neustadt, formerly president of the Neustadt Auto & Supply Co., of St. Louis, and Eugene De Prez, formerly manager of that concern, have established the Pacific Sales Corporation, 50-56 Van Ness avenue, San Francisco, Cal. Their territory extends from the Canadian to the Mexican lines and the Rockies.



THE NEW BUSINESS HOME OF JAS. L. GIBNEY & BRO., 215-17 N. BROAD ST., PHILA., PA.

The partnership of Jas. L. Gibney & Bro., consisting of James L. and John, started business at 1015 Arch street in 1899. It is one of the most conspicuous examples of what industry, integrity and ability will accomplish in the face of great odds, for in the early years, or during the development period, this firm was compelled to make headway with practically little or no capital. It is for this reason that this progressive house has had a remarkable career, for from the start ten years ago, without business prestige or capital, it has built up one of the greatest tire and accessory distributing depots in the United States. The average annual increase in the volume of its business has been over 50 per cent. and this phenomenal growth during the past few years made it necessary to obtain new quarters, for which purpose the building on Broad street above Race was erected. It is in the heart of what is known as "Automobile Row."

The first floor is devoted to show rooms and office, both of which are ideal in their appointments and show that excellent taste has been displayed in their equipment. There are two waiting rooms in the forward part of the ground floor, equipped with writing desks and comfortable lounging chairs, which are for the convenience of all automobilists, as James L. Gibney & Bro. are making an announcement to the trade and owners of their facilities and inviting them to make their show rooms their headquarters for appointments and correspondence. This very novel and original courtesy has met with spontaneous response and the saying "Meet me at Gibney's" is already a popular slogan in Phila"

The second floor is used principally for a stock room. All tires and automobile accessories and parts are carefully and systematically arranged in bins.

The upper floor is known as the shop, which is probably one of the best equipped in the United States for handling either pneumatic or solid tires.

In the entire building is 16,000 feet of floor space. This firm are manufacturers of Gibney wireless motor tires and are distributors in seven States for the Continental pneumatic tires. Their new head-quarters are used for both wholesale and retail business and a repair department, their tires being manufactured at Akron, Ohio

Upon entering the sales room one is impressed with the neatness and freedom from a disorderly appearance which is so noticeable in most automobile supply stores. To the left are automobile sundries and to the right tires. Although the retail selling department is one large room,

it is so arranged that it practically makes two stores, thus separating the tire business from the automobile accessory branch.

The marketing of good products and the principle of dealing fairly with customers has been the chief cause for the growth and success of this enterprising firm.

NEW WESTERN SUPPLY COMPANY

The Moore Motor Supply Co., of Golden Gate and Van Ness avenues, San Francisco, Cal., has recently been organized, with Chas. C. Moore, of the Chas. C. Moore Co., engineers, as president. Mr. Moore and W. E. Duzan are prepared to advance as much capital as may be required to carry on the business.

Mr. Chas. C. Moore has been the president of the San Francisco Chamber of Commerce until very recently, and is one of the most prominent as well as one of the most energetic business men on the coast. Chas C. Moore & Co., engineers, are closely connected with the Babcock & Wilcox Co., and handle engineering work on a large scale, having designed and constructed some of the largest power and engineering plants on the coast. Mr. Moore will take an active part in the business, which, it is expected, will materially enlarge and expand in the near future. Branch stores are being maintained in Los Angeles and Oakland.

LOCOMOBILE OPENS WESTERN BRANCH

A new branch of the Locomobile Company of America has just been opened in San Francisco in palatial quarters at No. 226 Van Ness avenue. It is in charge of Irving J. Morse, who until recently was manager of the Locomobile branch in Philadelphia. Associated with him is J. Murray Page, who has been connected with Locomobile interests for the past ten years and who has been conspicuous in Pacific coast contests for some time. Page won the 24-hour race at Los Angeles with a stock Locomobile last fall and more recently won the famous \$10,000 match race in the same city with a 40 H. P. model. This car, which was christened "Casey Jones," covered 150 miles on a mile track in 2 hrs. 47 min. 13-5 sec., establishing a new world's record for the distance.

Morse has been with the company for ten years, a considerable portion of which was spent in England when the Locomobile Company had a large foreign business in the early steam cars.

The Rapid Motor Vehicle Co., Pontiac, Mich., announces that Mr. C. S. Bugbee has taken the position of district sales manager for the city of Detroit. Salesrooms are located at 467-69 Woodward Avenue.

A NEW AUTO REPAIR TRUCK

The most important feature of this repair truck is that it is provided with means of holding the truck in position while the operator is doing the work. It is designed to fill the requirements of the chauffeur and owner. The truck is provided with castors which allow the operator to propel himself under the car to the place where the work is to be done.



The Motor and Mfg. Works Co.'s Auto Repair Truck.

To prevent the truck from moving, when using a wrench or screw-driver, it is anchored by throwing the hand levers into the position shown on the cut. This raises the back castors off the floor and allows the truck to stand on the feet, as shown.

It is provided with a sliding shelf for carrying tools and for placing small parts that are taken off the car. The shelf is clamped to the side of the truck and can be removed, placed on either side and in any position, back or forward, as desired. The truck is strongly constructed, being glued and fastened together by means of screws. The head rest is made of genuine leather. The list price of this truck complete is \$4.25. Without anchor the truck lists at \$3.25, and without anchor or shelf, \$3.00. This truck is manufactured by the Motor & Mfg. Works Co., Geneva, N. Y.

THE "M & E" REPAIR GLOVE

M & E Mfg. Co., Ashland, Ohio, are manufacturing the M & E Repair Glove shown herewith. This glove is water and grease-proof. The hand is made of soft durable water and grease-proofed black



The "M & E" Repair Glove.

goat skin, and the cuff is made of a new water and grease-proofed fabric called oilskin. It is stiff yet pliable and will always keep its shape. The glove lists at \$1.00 per pair; half dozen pairs for \$5.00.

Maintaining all cars purchased from them for one year at a fixed rate per month is a new plan instituted by the Cordner Motor Company, which represents the Acme car at 1540 Broadway, New York City. The rate charged is averaged from the actual operation expenses of a large number of Acme cars.

THE "G-P" QUICK SERVICE PUMP

In order to meet the demands for a high powered air pump which can be carried on the automobile or used in the garage, the Gleason-Peters Air Pump Co., 255-61 Classon Ave., Brooklyn, N. Y., has placed on the market the No. 4 "Quick Service" lever pump, shown herewith.



This pump is fitted with specially designed base which is fastened to the running board of an automobile so that the pump can be attached to the same in a few seconds. This attachment can be screwed to the base of the pump and folds neatly up against the side of the cylinder so that the pump can be conveniently stored under the side of the machine. The price of the pump is \$7.50. The cylinder of this pump is of special gauge seamless brass tube and the base is of solid bronze The yokes, levers, links metal casting. and cross heads are of the finest gray iron. The plunger rod is 1/2 in. steel and is fitted with a bronze metal bushing. The price of this pump is \$7.50 and the price of the attachment is \$1.50.

The Firestone Tire & Rubber Co., Akron, Ohio, has made an improvement over the recently adopted practice of branding the required air pressure on all tires of 3½ inches and over by branding the air pressure on the side of Firestone tires where the chauffeur can see it staring him in the face every time he applies the pump. The recommended air pressures which are thus moulded into the tires are as follows. For 3½-inch tires, 60 pounds; for 4-inch tires, 75 pounds; for 4½-inch tires, 85 pounds; for 5-inch tires, 90 pounds, and for 5½-inch tires, 95 pounds.

The New York branch of the Sultan Motor Co recently moved to its new show room, 1569 Broadway, where better facilities are offered for the display of its runabouts, town cars and taximeter cabs. The sales department and main office are located at this place, but the factory remains in Springfield.

RETAIL NOTES.

A garage and repair shop has been opened in Marion, Ohio, by G. E. Abel & Co., who are agents for the Mitchell.

agents for the Mitchell.

E. W. Ames, of Caldwell, has leased a building at 127 W. Douglas avenue, Wichita, Kan., and has taken the agency for the Marmon and Oakland. G. W. Troutman, also of Caldwell, is manager of the Wichita sales-

The Automobile Sales and Repair Company is a new concern formed by the consolidation of the business of H. A. Abbott and the Franco-American Auto Co., and which has located at 909-915 North Broad street, Philadelphia, Pa. The officers are: President, W. J. Robertson, Jr.; Vice-President, G. F. Hallman, and Secretary and Treasurer, H. A. Abbott bott.

The Oakland is being represented in Cleveland, Ohio, by the Avenue Motor Car Co., at the new_salesroom, 1860 Euclid avenue.

B. F. Benson is manager of the Studebaker garage that was recently opened at 355-357 North Craig street, Pittsburg. Lyman J. Botts, of Red Oak, ia., has opened a garage and salesroom at 209 Coolbaugh

street.

Paul Brookner, of Dixon, Ill., has moved from Hennepin avenue to East First street, where he is conducting a garage and sales-

The Drennan Department Stores, of Birm-ingham, Ala., have opened a garage and sales-room at Avenue C and South Twentieth street, under the management of G. B. Kelley. Peerless cars are being shown.

less cars are being shown.

A. L. Dyke, Broadway and Pine street, is about to purchase a garage and show room. in which to display the new \$750 Hupmobile, for which he has taken the agency.

The New York branch of the Franklin Automobile Company is now selling used cars. A salesroom has been opened at Seventy-fourth and Broadway. fourth and Broadway.

Howard C. Harris, of the Idanha Motor Car Co., of Portland, Ore., has opened a branch of the company at Seattle, Washing-ton, 1414 Broadway.

Fred. R. Jenkins & Co. is the name of a concern which recently introduced itself into the automobile field by opening an agency for the Columbia, at 1330 Michigan avenue, Chicago, Ill.

The Kisselkar Co. has opened a salesroom at 1122 East Fifteenth street, Kansas City, Mo., under the management of C. A. Post.

Mo., under the management of C. A. Post.

The Wisconsin State agency for the Lozier
was recently established by Willard V. B.
Campbell in the William F. Mueller garage at
Farwell avenue and Brady street, Milwaukee.
The Midland Motor Car Company, of Kansas City, Mo., expects to move into its new
\$30,000 building some time next month.

A new company was recently organized in Portland, Ind., under the name of the Portland Automobile Company. The new concern has purchased the motor car department of the Jones Cycle and Automobile Company and will deal in old and new cars and auto sup-

Pink & McViets, agents for the Franklin in Ottawa, Canada, are now occupying the Morris Arcade as their headquarters.

Gus D. Revol, a carriage dealer of New Orleans, La., has started in the automobile business and will handle cars and accessories.

A branch of the Royal Tourist Car Com-pany of Cleveland, has been opened at Sixty-second and Broadway, New York City

second and Broadway, New York City

The Segerstrom Automobile Company has
been incorporated in Milwaukee, Wis., with a
capital of \$60,000. The new company intends
to conduct an agency and later on to manufacture motor trucks. The officers are: Frederick W. Segerstrom, President; J. M. Downs,
Vice-President, and J. A. Hunter, Secretary
and Treasurer. and Treasurer.

A building, 50 x 50, is to be erected in Beaver Dam, Wis., on West Front street, by the newly organized Silo Garage Co., who will open a salesroom, garage and repair shop.

GARAGE NOTES

Plans for a \$150,000 garage and stable have been prepared for the Denver Omnibus and Cab Company, Denver, Col.

The Atlantic Automobile Company, of Atlantic, Ia., is enlarging its garage with an addition 50 x 50 feet.

A 60 x 100 feet garage is being built in Marshalltown, Ia., for the Johnson Automobile Company.

bile Company.

Maxwell and Reo agencies are to be estab-

Marshalitown, 182., for the Sommon Automobile Company.

Maxwell and Reo agencies are to be established in the large modern garage now being erected on Fifth street, Mason City, 1a.

B. A. Stocking has opened a garage in the Sampey Building, on West McDonald street, Newton, Ia.

W. H. Beck, Sloux City, Ia., is building a garage which, when finished, will be equipped with all the modern improvements.

The Cedar Valley Garage & Repair Shop, having a floor space of 5,400 square feet, has been opened in Waterloo, Ia.

A garage is being built in Quincy, Ill., at the rear of 1719 Main street, for Henry Geise.

A \$6,000 garage has been erected in Quincy, Ill., by Massie & Sons, adjoining their machine shop at 219 North Fourth street.

The new Red Spring Garage at Glen Cove, L. I., has been formally opened by the owners, Weeks & Underhill. It has accommodations for 25 cars, first-class machine shop and show room.

The Arlington Automobile Co., Arlington, Mass., has opened its new fireproof garage at 450 Massachusetts avenue. The building is of brick and reinforced concrete, and is equipped with all modern garage conveniences. The company has the agencies for the Mitchell cars and Rapid trucks. It is conducting a general garage, sales and repair business, and also a livery service with two cars.

R. Groswold, of Minneapolis, Minn., has opened an automobile repair shop at Rice Lake, Wis.

R. Groswold, of Minneapolis, Minn., has opened an automobile repair shop at Rice Lake, Wis.

The Range Motor Co., of Virginia, Minn., has opened a garage at that place under the general management of Arthur L. Myers.

A brick garage and storeroom is being built at 2218 Farnam street, Omaha, Neb., for the Baker Electric Co. The new building will be one story and basement, modern in every detail and contain a power plant and equipment for building, rebuilding and recharging batteries.

The Atlantic Automobile Company and Machine Works Garage, South North Carolina avenue, Atlantic City, N. J., was reonened under the management of F. A. Broadhead after having been closed for a short period. A repair shop and supply store will be conducted in connection with the garage.

A concrete, fireproof garage, 36 x 132 feet, is being erected at Syracuse, N. Y., for Mrs. M. A. Ritchie, who will rent it out.

A garage has been opened in Leipsic. Ohio, at the corner of Defiance and Easton streets, by H. H. Townsend & Co.

J. B. Nolin & Son have leased the American House Stables at Wooster, Ohio, and are making the changes necessary in order to use it as a garage.

Aloysius Jones has opened a 48,000 square feet garage at Fortieth and Baring streets, Philadelphia, Pa.

F. K. Mears has opened the Regent garage and repair shop at 4525 Springfield avenue,

F. K. Mears has opened the Regent garage nd repair shop at 4525 Springfield avenue,

and repair shop at 4525 Springfield avenue, Philadelphia, Pa.

Benjamin E. Sattler, of Philadelphia, Pa., has purchased the property at 804 Noble street, on which he expects to build a four-story automobile warehouse and garage.

Fred. D. Rathbun is manager of the Central Garage, which is the reorganized Central Automobile Co., 5989-91 Center avenue, Pittsburg Pa.

Armstrong & Brown, plumbers, have established a garage in Madison, S. Dak.

The Thomas Botterill Automobile Company, of Salt Lake City, Utah, recently opened a 67 x 160 feet garage at 38 South State street.

A garage and repair shop will soon be opened on Second street, Hartford, Wis., by James Favour.

STERLING (S) TIRES

WHEN one of our tire makers puts a layer of fabric or rubber on a core, he has to stop till it is inspected—then he puts on another, and that's inspected. In addition, each tire maker gets a weekly premium for a perfect score—meaning "no seconds."

Sterling tires are cured on air-bags, giving internal as well as external pressure, and thoroughly amalgamating the different fabric plies and layers of rubber. That's why Sterling treads and carcasses don't separate—they stay "put."

Sterling Blue Tubes

Our tubes are blue and in making them blue we make them better than any other tube. There may be other tires nearly as good as ours, but the Blue Tube is absolutely unequalled.

Rutherford Rubber Co., Rutherford, N. J.

New York, Broadway, at 53d St.
Baltimore, 300 W. Baltimore St.
Columbia, S. C., E. A. Jenkins Motor Co.
Albany, Ga., Clark's Garage
Troy, N. Y., 1934 Sixth Ave.
Rochester, S. B. Roby Co.
Toledo, O., 436 Summit St.
Cincinnati, 108 W. 3rd St.
Newark, O., Ball-Fintze Co.
Chicago, 1404 Michigan Ave.

Philadelphia, 680 North Broad St. Richmond, Gordon Motor Co. Savannah, 109 W. State St. Jacksonville, McGraw Bros. & Vogt. Syracuse, 248 W. Washington St. Buffalo, 43 Niagara St. Columbus, 15 E. Spring St. Dayton, O., 4th & Jefferson Sts. St. Louis, 3932 Olive St. St. Paul, 16 W. Fourth St.

San Francisco, 50-56 Van Ness Ave.

STERLING BLUE TUBES



EDITORIAL

SOME ADVANTAGES OF MOTOR DELIVERY SERVICE

Motor trucks are being used in increasing numbers throughout the entire country, particularly by express companies and business firms handling large quantities of goods, although the increase in the sale of trucks has been much slower than during the corresponding development in the history of pleasure cars, yet this increase has been a steady and healthy one which can be taken as proof that there are good and sufficient reasons why motor trucks should be used in place of horses.

The very large number of motor trucks now being operated by two or three of the large express companies is a very strong argument for the efficiency and satisfactory performance of the motor truck for general delivery purposes, yet many of our large business concerns hesitate to adopt what is to them a new and untried method of delivery, and few seem to realize the many advantages for delivery over the horse-drawn vehicle which a modern up-to-date commercial vehicle possesses. Of course, it is understood that there are. and will always continue to be, peculiar conditions pertaining to certain classes of delivery which will prevent the motordriven truck from showing to advantage over the horse, but these are granted by most to be decidedly the exception rather than the rule.

Delivery in the larger cities is becoming more and more of a difficulty owing to the enormous territory which has to be covered if a large and successful trade is to be established. The range of delivery service has gradually become extended until the horse has been found incapable of covering the necessary distances within a day and is practically unfit for service on the following day, whenever extended routes are attempted. With motor trucks these routes can be covered easily and with dispatch making possible an earlier delivery of goods in districts which previously did not receive deliveries until the following day. In some cases it has been found necessary when horse vehicles were employed, to make use of railroads in transporting goods to a suburban district and there either hiring local delivery companies to handle the articles or else provide what might be termed a sub-station of the main delivery service at that point. This necessitated the packing of the goods on the wagons, unpacking and loading at the station, removal from the cars and again loading the wagon at the suburban station. With motor trucks a single loading at the delivery department is all that is now required and the goods are taken direct, with out any rehandling, to the district in which they are to be distributed. In such cases, the motor truck has shown itself to be much cheaper than any other form of delivery. However, as stated where the hauls are shorter, the advantages of delivering by motor over horse-drawn vehicles grow less. Nevertheless, in innumerable in stances, in and around New York, Philadelphia, Chicago, Boston and other centres, the speed possibilities of the truck, on even comparatively short hauls have made it of inestimable value. We refer particularly to cases in which goods are to be shipped and railroad stations to be reached in quick time in order to insure the goods being taken on certain trains. By driving the horses to their utmost, some of these trains could be made but the slightest congestion in the traffic, slippery streets, snow, or exceptionally hot weather, and many other conditions, made it impossible to depend upon the uniformity of such deliveries. With the motor-driven trucks, on the other hand, equally large and larger loads can be carried and the stations reached with almost clock-like precision, in ample time for shipment, thus gaining in the case of goods to be shipped considerable distances, anywhere from 12 to 24 hours in the time of their reaching their destination.

A notable advantage of the motor delivery vehicle over the horse is also shown in hilly districts where considerable grades have to be negotiated. In such localities, with the old method of delivery, it was not at all unusual to have to make detours of from one to two miles in order to avoid certain difficult hills which were almost, if not impossible, for the teams when heavily loaded. Another feature of disadvantage was the fact that with the horses, the delivery in these districts was not uniform, Certain hills being possible to the horses during seasonable weather direct routes were taken, while perhaps the next day, or during rainy or inclement weather, the same districts which received early

deliveries the day before, must wait until much later, as the hills could not be covered under the circumstances by the horsedrawn vehicles and longer routes of neces-

sity must be taken.

With the amply powered modern automobile truck almost anything in the shape of a hill can now be successfully climbed; in fact, the actual time consumed in climbing a hill in wet weather is practically the same as during dry weather, as in both instances the low gear in all probability would have to be resorted to.

Uniformity of service obtainable with motor-driven vehicles regardless of weather conditions which ordinarily would completely demoralize any horse delivery service, is one of the strong points in favor

of motor trucks.

The foregoing are but a few of the instances in which the motor truck shows to decided advantage in delivery service. These are palpable conditions, but perhaps no more important than many minor circumstances which are not so apparent to the uninitiated. Increased satisfaction among one's patrons is a strong factor in increased sales. The value of promptness and uniform delivery of goods, in building up a business cannot be overestimated. Deliveries within a few hours are always appreciated and assuredly work to the advantage of the concern which is able to guarantee such service.

COMMERCIAL CARS IN JAPAN

The advantages of the motor car as a means of transportation and as a commercial vehicle are appreciated even in Japan. This style of conveyance is very popular and in the thickly settled portions of Japan is rapidly leaving the quaint "rickshas" in the rear. A transportation company in Tokio is reported as being a financial success. The rates of hauling goods by commercial vehicles vary from \$2.50 to \$5.00 for one mile according to the value of the goods and from \$11.00 to \$25.00 for 5 miles. In rainy weather there is an extra charge of twenty per cent.

Automobiles with a motorman and a porter may be rented for an eleven-hour day for \$12.00, half a day for \$6.50, and one

hour for \$1.50.

USE OF MUNICIPAL VEHICLES GROW-ING

The commercial motor vehicle as a means of conducting the delivery branch of a business is no longer an experiment. It has been tried and not found wanting.

Five years ago the automobile as a commercial car was practically unknown. Today it is a reality and the outlook for the coming year is exceptionally bright. With the economies attendant upon the recent financial stringency the attention of the

business world was called to the cost of horse traffic, which resulted in a thorough investigation of the power wagon and its merits.

Aside from the saving in the cost of upkeep of the commercial car, there is another reason for its invasion into the industrial field being welcomed. In the case of police, fire, hospital and other official uses the speed of the automobile is a very great advantage. The best proof of this is the fact that quite a few are being purchased and used all over the United States by municipalities and individual officials. The War Department has installed a Model 43, 1500-pound Waverly electric delivery wagon. The city of New York owns and operates about 100 motor vehicles, valued at about \$300,000. It conducts a model garage, and outside of the cost of a chauffeur, which averages some \$1,200 a year, the cost of up-keep, including tires, gasoline, lubricating oil, repairs, etc., does not average \$250 a machine, and the cars are garaged right in the heart of the city, where ground rent is higher than in any other city in the world.

A motor chemical wagon, costing \$5500, has been ordered by the Pioneer Fire Company, of Jenkintown, Pa., a small but wealthy suburb of Philadelphia.

George Duckworth, of Hutchinson, Kan., figured out that an automobile is cheaper than railroad fare, so he purchased a Buick car, which he is using to go after delinquent taxpayers and in summoning jurors and witnesses.

Another Hutchinson man to gladly succumb to the habit is Harry Fenn, a rural mail carrier, who, after wearing out seven horses in three years, bought a Ford roadster, and now makes his rounds in about two hours while before it took him

Three more autos will soon be in the municipal service of Newark, N. J. They will be used by the engineers of the sewer and water departments.

The street car strike in Louisville, Ky., last fall taught the authorities of that city a lesson which resulted in the purchase of three Cadillac Thirties for use in the police department.

Automobile patrols are becoming com-The latest of the Southern cities to fall into line is New Orleans, La., with a Studebaker patrol. The new machine is to be used as an emergency vehicle as well as a patrol.

About the latest thing in commercial autos is a street sweeper which the inventor claims can make fifteen miles an hour and thoroughly clean the streets.

Ten taxicabs have been ordered by the Frank Bird Transfer Company and the Indianapolis Transfer Company, of Indiana apolis, to which it is affiliated. The care will be placed in service at hotels and depots in Indianapolis, Ind.

The Sternberg 1000 Lbs. Delivery Truck

HUGH DOLNAR.

The Sternberg Motor Truck Company, Milwaukee, Wisconsin, U. S. A., is offering a new light delivery truck, two sizes, 1000 to 1500 lbs., and 2000 to 3000 lbs., paying load, gas engine driven, the larger truck fitted with either friction drive or sliding gear, as purchaser may select, to the divided counter-shaft with naked side-chains to the rear wheels.

This new Sternberg light truck was first placed on the road late in 1908, and was subjected to some very hard long distance

The Sternberg light delivery truck here shown has a capacity of 1000 lbs., paying load, and can handle fifty per cent. overload. The wheel base is 88 ins. and the gauge 56 ins. Solid tires, 34 x 21/2 ins., are fitted in front, and 36 x 3 ins. in the rear. Wheels are either "Indestructible," pressed steel side-plates riveted to steel rims, or wooden spoke, as ordered. The motor is two cylinders, opposed, 5 x 4 ins., 4-cycle, water-cooled by thermal circulation. A Schebler carburetor is fitted. Ignition is



Fig. 1. Sternberg 1000 lbs. paying load truck; wheel base. 88 ins.; gauge, 56 ins.; solid tires, 34x2½ lns., front; 36x3 ins., rear; option on wheels; motor 2 cylinder, 20 H. P. nominal, 5½x5.. 4 cycle, water cooled, thermal circulation, set under foot board; jump spark ignition by magneto and dry cells; single disc and paper wheel friction drive to the balance gear and divided counter shaft with sprockets and chains to rear wheels; high speed 15 to 20 miles per hour; price, without body. \$1175.00, including two oil lamps and tools.

tests in which it showed a highly creditable performance, the friction drive giving excellent results under most trying conditions.

The Sternberg Company is a very strong advocate of the friction drive, claiming high efficiency, silence and ready handling, with all speeds within the entire range from zero to maximum, with low up-keep charges. It is asserted that the yearly charge for friction paper wheel face replacement is less than that of lubricating oil required by a sliding gear transmitting equal power.

This Sternberg truck is built in two sizes, 1000 and 2000 lbs, paying load, actual capacity fifty per cent. overload. style of body is supplied to order.

by Bosch magneto and dry cells. Nominal 20 H. P. single disk and paper wheel friction drive to the balance gear and divided counter-shaft with sprockets and chains to rear wheels. High speed is from 15 to 20 miles per hour. Price, without body, \$1175, including two oil lamps and tools. This 1000 lbs. paying load Sternberg truck is made with friction drive only.

PRINCIPAL SPECIFICATIONS OF THE 2000 LISS. STERNBERG TRUCK.

Same general appearance as shown in Fig. 1, can handle 3000 lbs. paying load. Wheel base is 110 ins. and gauge 56 ins. Tires are solid, 34 x 3 ins. in front by 36 x 31/2 ins. rear. Wheels "Indestructible" pressed steel side disks riveted to steel tire rims, or wooden wheels, as ordered.



Fig. 2. Sternberg 2000 lbs. paying load truck. Speed change gear box and levers assembly, three speeds forward and a reverse, all gears constantly engaged, no gear teeth sliding into and out of engagement, solid jaw clutch speed selection.

Motor, two opposed cylinders, 5½ x 5 ins., 4-cycle, water-cooled, thermal circulation. The motor is extra heavy throughout, and is under the footboard, where is is instantly accessible. Ignition is by magneto and dry cells, with jump spark plugs. The drive is either friction or clutch-gear speed-change, all gears always in mesh, to balance gear and divided counter-shaft with naked side chains to rear wheels. With the clutch-gear speed-change a cone-clutch, leather faced, with cork inserts, is fitted. Price, friction speed change, without truck body, \$1675, including two oil lamps and tools.

Price, same chassis and motor, without body, but speed-change through coneclutch and clutch-gearing, all gears always in mesh, direct to balance-gear drum on high speed, \$1950, including two oil lamps and tools. Speed 15 to 20 miles per hour.

CHASSIS SPECIFICATIONS, STERNBERG 1000 LBS.
PAYING LOAD TRUCK.

The front axle is a steel drop-forging, I-section, 2½ ins. deep by 1½ ins. wide, wheels on Timken roller bearings. The rear axle is 1% ins. square, wheels also on Timken roller bearings. The springs in front are semi-elliptics, 48x2 ins., and rear, full elliptics, 40 ins. long by 2 ins. wide.

The motor: 2 cylinders opposed, 4-cycle, water-cooled by thermal circulation, set in under footboard. Force-feed oiling. Ignition is by magneto and storage battery. Nominal 20 H. P.

Drive is by friction to balance gear with divided counter-shaft and sprockets and chains to rear wheels. The driving disk is of alloy, 20 ins. dia., fibre friction, wheel is 24 ins. dia. by 1½ ins. face. A ball-bearing thrust collar is fitted to take disk thrust. The counter-shaft is mounted on Timken roller bearings. A 20-gallon fuel tank is placed under driver's seat. Brakes are fitted, one on each rear wheel, and one on counter-shaft. Steering is by worm and nut, with large hand wheel. All bodies are supplied to order to suit service; body price extra, as agreed upon.

Spark and throttle levers on steering column. Two outside hand levers, right of driver, outer lever applies jack-shaft, emergency brakes. Inside hand lever controls speed change. Pedal control of ordinary brake to both rear wheels.

The front axie is a steel drop-forging, 2½ ins. deep, 1% ins. wide, wheels on Timken roller bearings. Rear, steel, 1¾ ins. sq.,



Fig. 3. Sternberg 2000 lbs. paying load truck. Speed change gear, 3 speeds forward and a reverse, ah quart alwars in mesh. Solid jaw clutch speed selection. No greats sliding together.

wheels on Timken roller bearings. Springs are all semi-elliptics, front, $40 \times 2\frac{1}{2}$ ins. wide; rear, $46 \times 2\frac{1}{2}$ ins. wide.

The motor is a very heavy Sternberg special design. The opposed cylinders are 5½ x 5 ins., 4-cycle, water-cooled, thermal water circulation. The motor is placed under the footboard, readily accessible. The oiling is by a non-adjustable force-feed oiler, in integral assembly with the motor. No waste of oil and no failure in oiling so long as there is oil in the lubricating oil reservoir. The crank-shaft is very heavy, 2½ ins. bearings, and wrist dia., 5 ins. long at fly-wheel end, 4 ins. long in front, wrists 3 ins. long x 2½ ins. dia., glying ample connecting-rod bearing on the crank-wrist. Ports are 2 1-16 ins. in dia. Nominal H. P., 30.

Drive is either friction, alloy disk, 20 ins. dia., fiber wheel 24 ins. dia. x 1½ ins; fiber-face; ball-bearing to take disk thrust, counter-shaft in Timken roller bearings or a

cone clutch, leather face, with cork inserts and a spur-gear speed-change, all gears in constant engagement, with solid jaw clutches to the shaft. The gear shift is selective, with single movement of shift lever to obtain any speed. See Figs. 2 and 3 for exterior view of Sternberg gear box and levers, and horizontal view, showing arrangement of gears always in mesh and the solid-jaw speed selecting clutches.

The fuel tank is of 20 gallons capacity, placed under the driver's seat. The rear wheel hub drums are 14 x 2 ½ ins., and are used for the ordinary brakes. An emergency brake drum is fitted to the countershaft. Steering is by a worm and nut, with extra large hand wheel.

All bodies are extra, to suit service, at price agreed upon. Bosch magneto, fixed spark, throttle lever on the steering column, no spark lever. Speed change and brake levers at driver's right.

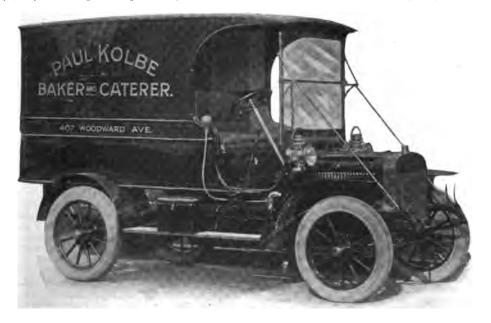
"Cartercar" Delivery Wagon and Taxicab

Herewith are shown two commercial cars manufactured by the Cartercar Co. of Pontiac, Mich., namely, the Cartercar Model C Delivery Wagon and the 1909 Taxicab.

The delivery wagon is fitted with a 24 H. P. motor, two cylinders opposed, 5½ x 4½ ins. The car has a paying load capacity of 1000 lbs. The wheel base is 96 inches and the gauge 54½ ins. Price of this model with standard body as shown is \$1,400, including 3 lamps, mats, horn and

tools. The car complete weighs 2,100 lbs. Other styles of body can be furnished as desired.

The Cartercar Taxicab uses the same chassis as the Cartercar Model K pleasure car. The motor is two cylinders, $5\frac{1}{2}$ x 4 ins., opposed, nominal 24 H. P. The connecting rods are steel castings, and the rod caps are hinged above and bolted below, oblique, joining plane of rod and cap. Each cylinder, water-jacket and half of the crank-box form a single integral gray iron



The "Cartercar" Model C Delivery Wagon, 1000 lbs., paying load; wheel base 96 inches: gauge 54½ inches save wheelbase the chassis is the same as Model G pleasure car; motor two cylinders 5½ x 4½, opposed, nominal 24 H. P.; weight with standard body as shown, 2100 lbs. Price \$1400.00, including 3 lamps, mats, horn and tools.



Cartercar 1909 Taxicab; same chassis as the Cartercar Model K; motor two cylinders. 5½ x 4 ins.. opposed. nominal 24 H. P.; the rear scat takes 3 passengers and folding seats in front accommodate two more, making seats for five passengers inside. Weight 2250 lbs.; price \$1890.00, including 5 lamps. 3 oil lamps and two acctylene lamps and generator, with mats, horn and tools.

casting, the crank-box joint being fitted metal to metal, oil-tight. The lubrication is by 6-lead mechanical oiler, gear driven from the cam-shaft. One oil lead goes to each main crank-shaft bearing, one to each cylinder, and one to each crank-arm, grooved to oil the respective crank wrists by centrifugal action. The drip from all six oil leads replenishes the crank-box splash pool.

USES RAPID CAR FOR SIGHTSEEING

A. J. Crawford, of Cambridge, Ill., has been using a Rapid 22-24 H. P. gasoline car for the last 2 years for sightseeing purposes, and which so far has been giving entire satisfaction.

The motor used in this car is of the double opposed type set under the body. The car cost him \$1800. Mr. Crawford stores his own car. He covers from 25 to 80 miles per day with it, averaging about 8 to 10 miles on a gallon of gasoline, and 70 miles on a gallon of lubricating oil. Repair work and repair parts cost him about \$50 per year. His experience has taught him that more horse power is required when a car is used atogether on dirt roads than when used on built-up roads. He has had considerable trouble in securing a com-

seat furnishes seating capacity for three passengers and folding seat in front accommodates two more, making seats for five passengers inside. The weight is 2,250 lbs. Price is \$1,800, including 5 lamps, 3 oil lamps and 2 acetylene lamps and generator, with mats, horn and tools.

The body is of approved design, best

materials, and excellent finish. The rear

petent driver, claiming that most drivers want to run the car as fast as it will go.

CHICAGO TAXICAB COMPANIES CONSOLIDATE

Four of the largest taxicab companies of Chicago, Ill., have combined, forming the Chicago faxicab Company with a capital of \$2,000,000. The deal was financed by W. W. Tracy, temporary president of the new concern.

Taxicab drivers in New York, where twenty blocks on the avenues measure exactly a mile, boast that on rainy days they can register a mile every seventeen blocks, on the asphalt, because of the skidding of the wheels.

GRAMM-LOGAN TRUCKS

The accompanying cuts show two characteristic types of trucks manufactured by the Gramm-Logan Motor Car Co., of Bowling Green, Ohio.

The stake body truck is powered by a 45 horse-power motor, 4-cylinder, water-cooled,



Gramm-Logan 45 H. P. Truck; stake body; 3 tons capacity; price of chassis, \$3500.

4% bore by 5-inch stroke. The carrying capacity is 3 tons. The wheel base is 126 inches. The bodies are extra to order; the price of the chassis is \$3,500.



Gramm-Logan 25 H. P. Truck; delivery wagon type body; 1500 lbs. carrying capacity. Price \$1800.

The delivery car type truck has a carrying capacity of 1500 pounds. The motor is 25 H. P., 4-inch bore and stroke, aircooled. Wheel base is 112 inches. Price of this model is \$1,800. Body is of regular delivery wagon type. These chassis have been described in detail in our January, 1909, issue, page 293.

ELECTRIC AUTO USED BY FIRE CHIEF OF DETROIT

The Board of Fire Commissioners of Detroit, Mich., has recently purchased from the Anderson Carriage Company, of that city, a Detroit Electric, roadster model, for the use of the fire chief in speeding to fires.

This is the first instance in which an electric has been chosen for this purpose.



Detroit Electric used by Detroit's Fire Chief.

The order was given in competition with other makes of electric vehicles.

The Detroit model chosen is built on the lines of a gas roadster and is seated for two. Its maximum speed is 22 miles an hour, at which speed the fire chief can reach the scene of a conflagration on the very outskirts of the city in less than 15 minutes' time. Two sets of batteries are supplied, so that it is constantly on charge, ready for instant duty the minute the alarm clangs in the chief's headquarters.

It is finished in fire department red, and in place of the rumble seat is carried a fair-sized supply box.

THE "CHURCHER" PUSH BUTTON

The Churcher Electric & Mfg. Co., of Cincinnati, Ohio, have recently placed on the market a push button, which is designed especially for electric trucks. The cut herewith shows the push button in actual size. This switch is used for oper-



The "Churcher" Electric Push Button for Electric Trucks.
Actual Size.

ating the electric gong usually found on electric trucks. The construction of this button is such that it is impossible for it to get out of order and it will not shock the operator when it is wet. Tramping on it or rough usage cannot break it or disarrange it in any way.

After having been used continuously for five years by three different owners it is claimed a 24-horsepower Pierce-Arrow has been placed in commission as a general utility car by the Edison Manufacturing Company of West Orange, N. J. The car is one manufactured in 1904. The only change made in the car was the removal of the tonneau and the substitution of a platform for boxes and other material.

EXPERIENCE WITH PACKARD MOTOR TRUCK

That a good motor driven truck is capable of much longer service than ordinarily would be suspected, is substantiated by the experience of the Packard Motor Car Co., of Detroit, Mich., which used one of its own three-ton trucks exclusively for hauling. It has been actually in service 522 days, during which it has covered 16,489 miles. Its principal work has been in hauling express and freight between the Packard factory and the different railway freight depots. The truck, in the time it has been in use, has made 1373 trips and has hauled 7,833,022 pounds of freight, or, approximately, 4000 tons. Its tonnage per day has been 15,006 pounds and its average tonnage per trip, 5705 pounds. The gaso line consumed in these 522 days of work has been 3548 gallons, or an average of 4.64 miles per gallon.

The Packard factory also employs a special delivery car for carrying mail and for other special purposes. This car is a 1907 Packard "Thirty" experimental car, which first went onto the road March 10, 1906, and was driven 55,000 miles. In April, 1908, it was equipped with a light delivery body and has since been the special delivery car. On this service it has done active work 252 days, and has covered 17,742 miles, making 1509 trips and an average per day of 70.4 miles. Thus, between its road service and its later work as a light delivery wagon, this car has made about 73,000 miles and will be continued in its present capacity.

A large manufacturer of four cylinder trucks in Lockport, N. Y., recently completed building a five ton chassis with regular trucking body of special dimensions, the same being 14 feet 6 inches long by 6 feet wide, for the Robert MacKinnon Co., of Little Falls, N. Y. The MacKinnon Company is one of the largest knitting concerns in New York State, and this new 60 H. P. truck will take the place of three heavy trucking teams that they have previously used in freighting raw materials from the railroad to the factory, and drawing the cased goods to the freight house. The truck, therefore, takes the place of three teams and two men, while the upkeep expense it is expected will be practically the same as for one team.

COMMERCIAL NOTES

John Arrington, a ranchman of Kansas, is now using an automobile to carry him to and from round-ups, and as a general utility conveyance for business trips and the like.

An automobile line has been established between Blue Ridge and Melissa, Texas, and several trips are made daily.

The Consumers' Ice Company, of Memphis. Tenn., has purchased from the Cullen-Butler Company, a three-ton motor truck which will be used in supplying ice to wagons and depots.

Des Moines, Ia., now boasts of an automobile patrol wagon.

A company has been organized at Greenfield, Mass., to operate a line of automobiles to Turners Falls and Northfield.

Ten taxicabs will soon be placed in service on the streets of Indianapolis, Ind., by John E. Morand, who has purchased the controlling interest in the Frank Bird and Indianapolis Transfer Companies. Both companies are backed by the same capital. The indianapolis Transfer Company is located at 215 North Delaware street, and the Frank Bird Company at 319 East New York street.

E. T. Lane, of the Southern Garage, Springfield, Mass., has placed in service three Atlas taxicabs, one of which is stationed at the Worthy Hotel, another at the railroad station and the third at the garage.

Charles Mayer & Co., jewelers, of Indianapolis, Ind., have discarded all horse-drawn vehicles and added the third motor wagon to their delivery service.

It is intended in the near future to establish a motor 'bus line between Moody and Waco, Texas.

The Nashville Taxicab Company, capitalized at \$30,000, will soon start a public cab service in Nashville, Tenn.

Four electric wagons were recently placed in service between the city college, post office station and the Washington Bridge station, New York City, N. Y.

New York City, N. 1.

The Schurmeier Wagon Company, 29-31
Western avenue, Minneapolis, Minn., has
started to manufacture auto trucks.

The Southern Commercial Motor Car Company has been created in Atlanta, Ga., with offices at 101-103 Fort Street. The new concern will manufacture commercial motor cars.

A company is being formed to operate a motor 'bus service on the new Queensboro bridge at New York City.

An auto 'bus line was recently put in operation between Seymour and Brownstown, Ind.

There is an auto stage line in operation between Shaniko and Bend, Ore., a 60 H. P. car making one trip daily.

The Sternburg Motor Truck Company, of Milwaukee, Wis., has received an order for a motor truck from the Board of School Directors of Milwaukee. The truck is to be used for the transportation of the public school supplies.

St. Louis, Mo., is soon to have an automobile ambulance for municipal use, and if this one proves successful, autos will be installed in other city departments.

Three 20 H. P. autocar busses have been installed by a corporation formed by citizens of Swarthmore, Pa., for use mainly to and from the station. The cars each seat ten per-

sons and make very good time.

The Taxicab Auto Company, with an office and garage at 460 Fourth Street, has been established at Macon, Ga.

Carl Manning, representing the Trenton Auto Garage and Supply Company, has sold to the Atlantic City Fire Department a D. R. model, 40 horse power Oldsmobile runabout to be used by the chief of the fire department.

A \$20,000 company is to be formed in the near future to operate a motor bus service in Traverse City, Mich.

A theatre motor service has been established in Milwaukee by the Wisconsin Automobile Exchange, 220 Wisconsin street. Five cars are now being used and the charge is \$1.00 per couple from residence to theatre and return.

The police department of Wilmington, Del., has purchased two Reading Standard motorcycles.

The Wyoming Automobile Transit Company. capital stock \$50,000, was recently chartered by the state, and will conduct an automobile stage service between Rock Springs, on the Union Pacific Railroad and the Yellowstone Park, entering the park through the southern and most beautiful gateway. The company is backed by Wyoming, Iowa and Chicago capital, and has already purchased machines for use in the service.

THE TAXIMETER HOLD-UP

An ordinance is under debate for the regulation of taxicabs in New York, the provisions of which seem for the most part just and reasonable. It aims to have a uniform rate of tariff, to have the meters attached to front wheels, so that customers will not be charged mileage for the spinning of the rear wheels on wet pavements. It has various other provisions that would be more interesting if it was perceptible how they are to be enforced and the motor-cab patrons protected. A man gets into a cab having a taximeter and thereby tacitly agrees to pay according to the registration of the meter. He rides what he knows to be two miles and what he has paid for as two miles in several other cabs. This time, however, the taximeter shows figures that charge him for a ride of three and a half miles. What can he do? The driver shrugs his shoulders; there is the taximeter; he does not know about any other taximeter or about distance measured otherwise. He knows that is the charge. He explains that he must turn in proceeds according to the meter. The man knows he is "stung," but he pays. He tries to pick the cabs with honest meters thereafter, but is not always successful. To obviate this situation is difficult. It may be proven that a meter registers falsely, but it is quite another thing to prove that anyone wilfully caused it to do so. Certain varieties of petty swindles are almost beyond the feach of the law and the individual must protect himself.

Realizing that the unceasing onslaught of the automobile into the commercial field will in the future put horse-drawn vehicles in the rear, Charles W. Sheetes & Son, of Indianapolis, who have been engaged in the livery business for some years, are building a \$11,000 concrete garage in the rear of 1015 N. Capitol avenue, and will conduct an automobile business and a taxicab service, four cars for which have already been ordered.

NEW YORK DEPARTMENT STORE USES THIRTY ELECTRIC WAGONS

R. H. Macey & Company, proprietors of a large department store in New York City, have for the past six years been using electric delivery wagons with the greatest satisfaction. This firm is now operating thirty machines rated at one ton.

Most of these machines have been remodeled, their weight being reduced from 5600 to 3700 pounds. About 40 miles per day are covered by each vehicle, on a single charge of the battery. The batteries are charged during the night in the firm's garage, which is well equipped and quite extensive.

All the cars are operated by men who were formerly horse drivers. One of the rules laid down by this firm and which no doubt helps considerably in keeping this service in good running order is the fact that the drivers are not permitted to have anything to do with the administration of the machines, their duties being strictly confined to steering the vehicles. In case of a breakdown the driver reports by telephone to the garage, when the company's emergency wagon is rushed to the scene and expert repair men remedy the trouble which has arisen, or else the disabled vehicle is towed to the barn and there carefully examined and repaired.

The company's chief engineer aims to keep the entire fleet in service every working day throughout the year, and owing to the high administrative methods practiced it is seldom that a wagon is in such a condition as to be reported unfit for duty.

At present there are over 4000 motor cabs in London, and the number is increasing at the rate of 1500 a year. Horse-drawn cabs are doomed to disappear as no one ever uses them if taxicabs are available.

The Frayer-Miller truck is being featured by Charles E. Stone, manager of the Motor Truck Company's New York offices recently opened at 244-250 West Fortyninth street.





The accompanying cuts show two White steamers used for commercial work. The cut on the left shows the car used by the chief of the fire department of Baltimore, Md. A similar car has been delivered to that city for the use of the Deputy Chief. At least one of these cars responds to all alarms. The other cut illustrates the patrol wagon recently delivered to the police department of Omaha, Neb. This car is in service twenty-four hours a day, with three shifts of drivers. It displaces six horses and does the work quicker and at less cost.

HEWITT TEN-TON TRUCK

The latest addition to the line of commercial cars, made by the Hewitt Motor Truck Co., 10 E. 31st Street, New York City, is a ten-ton truck driven by a 4½x 5½, 4-cylinder, vertical motor, which, according to the A. L. A. M. rating, should deliver 28 H. P., but which is said to have shown 36 H. P. on the brake at 1000 R. P. M.

The motor power in this ten-ton truck is the same as in the Hewitt five-ton truck. The running gear and frame are of special construction, the pressed steel frame being This is, however, a lower 9 ins. deep. speed truck than the five-ton type, the rated speed being 6-7 miles per hour, which is considered as fast as safety allows with a ten-ton load. The wheels have been designed so that the pressure on the ground does not exceed 700 pounds per inch of tire width, which is said to be far less than is usual with horse drawn vehicles where the loads quite commonly exceed a ton per inch of width.

Special roller bearings are used on the rear axle to accommodate large loads. Where the weight of material to be carried is great and the distance long or the loading and unloading rapid, these cars show great earning capacity. They are particularly suitable for coal delivery in large quantities, also hauling building materials, structural iron and machinery. Either this or the five-ton truck can be furnished to run on alcohol instead of gasoline if so desired, and at no extra charge. The use of alcohol permits the owner to run the trucks on docks as alcohol motors are not objected to by the insurance companies. The alcohol type develops more power The gasoline than the gasoline type. capacity is 27 gallons. Cooling is by means of a Livingston cellular radiator and centrifugal circulation pump. Ignition is by a Simms Bosch high tension magneto with fixed spark.

The chassis of this ten-ton truck lists at \$6,000 including driver's seat, lamps and tools. For \$500 additional a platform spoke body is furnished with top over the driver and storm curtains.

Several features of this enormous truck are of special interest. The transmission is planetary. The jack shaft is entirely mounted on Timken bearings. The control is by the Hewitt interlocking pedals for the two forward speed changes and the reverse throttle pedal, and throttle accelerator. This is all that are needed as they use a fixed spark magneto. From the jack shaft drive to the rear wheels is by 2-in. new design Whitney chain, which is the very largest. The brake drums are 28in. in dia., 41/2-in. face, the surfaces being cast steel and Raybestos. brakes were sufficient to skid the truck with ten tons' load. The wheels are made by Schwarz. These we are told are the largest wheels that have ever been constructed of this type. The hubs and fittings throughout on the rear axle are steel castings. The rear axles are 2½-in, wide and 5½-in, deep. The hubs are mounted on Timken bearings, being of special large size, which has recently been developed by the Timken Co., for use on trolley cars for the Brill Company.

The truck from the top to the ground is 8 feet. The coal will all run out through the side doors, as is common practice with steel horse trucks.

GREENWICH GETS LOCOMOBILE FIRE ENGINE

Greenwich, Conn., recently celebrated the arrival of its long awaited Locomobile fire engine. The new engine is mounted on a 40 H. P. Locomobile chassis, and has a total weight of 5,000 pounds. Although it carries heavy equipment, it has demonstrated its ability to travel 50 miles an hour and climb the steepest hills in the State in good time. The fire-fighting apparatus consists of two 35-gallon tanks for chemical solution and 250 feet of 14-inch hose. The flame extinguishing spray is generated from sulphuric acid and bicarbonate of soda, which are mixed automatically in proportions of acid, one quart; bicarbonate of soda, 6 pounds; water, 35 gallons. It requires four minutes to exhaust one tank and during this interval the other tank can be refilled and made ready, thus insuring a continuous stream for an indefinite period. A large searchlight and a regular complement of hooks, axes and hand extinguishers are also carried.

The Chicago Daily News, has recently purchased three Lambert trucks, each of 3-ton capacity.

The New York "Herald" and the "Evening Telegram" recently installed an automobile delivery service of ten cars, which are being used to distribute the papers to retail and branch offices.

The Akron, Ohio, postoffice is considering plans for establishing an auto service for the collection and delivery of mail. A test was recently made with a Brush runabout and it is said to have been very satisfactory.

A branch of the Whipple-Scarritt Company, of New York, known as the Taxi-Service Company, was recently incorporated in Trenton, N. J., for the purpose of doing business in Philadelphia. The new concern is capitalized at \$1,000,000.

Three automobile stages, with a seating capacity of thirty each, have been put into service by the Rutherford Transit Company, of Rutherford, N. J., between the Erie Railroad station and various points in the borough. This company was recently formed, with a capital of \$2000, to supply proper transportation to the station.

THE COMMERCIAL MOTORCAR CO.

INCORPORATED 1905

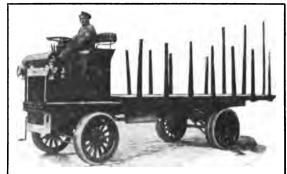
TIMES BUILDING NEW YORK, N. Y.

COMMERCIAL MOTOR VEHICLES OF EVERY SIZE AND TYPE, BOTH GASOLENE AND ELECTRIC. AUTOMOBILE DELIVERY AND TRANSPORTATION SYSTEMS INSTALLED COMPLETE.

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A Chance for the DEALER

OU know how muchor little—you make out
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many whims and fancies you
have to meet in selling them.



Five Ton Truck just shipped to the R. A. McKinnon Co., Little Falls, N.Y. Takes the place of three teams and two men. Cost for up-keep same as one team. Sixty horse power, four cylinder motor.

I want to introduce you to a business that has all the possibilities, as to volume, of the pleasure car trade, with less selling expense and practically no repair bother.

"American-Trucks" (4 Cyl.)

can be sold in any city. The demand is increasing every day. The dealer who gets the agency now is slated for a good, profitable, growing business.

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offer greater money-making possibilities to the live agent or business man, with financial backing, than any other line. Rapid Commercial Power Wagons are built in sizes from ½ to 6 tons capacity, for any line of business. Every user of one or more horses represents a prospective buyer. See the possibilities now? Write today for catalog and agent's prospectus.

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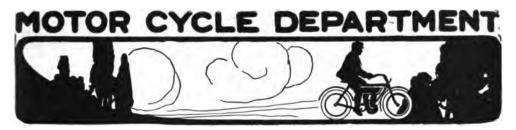
Here is a practical motor wagon without valve, water, oiler or tire troubles. It works perfectly under all road and weather conditions.

To the Dealer:

The Chase wagon has exclusive selling features your competitors can not offer. Our prices are right, discounts liberal and we have some vacant territory. Our proposition will in-

terest you. Catalog No. 16 tells the story. Write for it now.

CHASE MOTOR TRUCK CO. SYRACUSE, N. Y., U. S. A. 322 S. West St.,



EDITORIAL

TRICARS MORE POPULAR ABROAD THAN IN UNITED STATES

It is sometimes a surprise to those who have been abroad and seen the streets and even the outside roads, teaming with commercial vehicles, motor cycles and particularly with three-wheeled delivery and pleasure motorcycles, to find almost an entire absence of these latter vehicles in use in our own country. The use of side cars and fore-carriages is strikingly larger abroad than in this country; in fact, many comparatively iow-powered motorcycles are seen on the streets with side cars at tached, while in this country only the users of high-powered machines are commonly found using side cars or making their machines carry double. The use of fore-cars and regular three-wheel vehicles abroad has practically kept pace with the growth of the use of the two-wheeled machines and the three-wheelers are at the present time extremely popular in many of the large cities, motor delivery vans in some sections being as numerous, if not more so, than automobile trucks.

There are several reasons for this ar parent diversity of taste between Europeal. and American users, but in all probability the most important factor in the choice of two or three-wheel vehicles, is the character of the road surface. It will be found very difficult, if not impossible, to successfully operate either fore or side cars on many of the American roads, as soon as the city limits have been passed. The third wheel is immediately subjected to such twisting and wrenching that if rigidly attached, the entire machine is severely strained and soon gets loose and wobbly. Even what might be termed pivotally attached, third wheels are of necessity traveling the roughest part of the road if the motorcycle proper is driven so as to take advantage of the comparatively smooth track. The third wheel is always in the bumps and hollows, caused by the horses' feet when the road was wet and which after drying makes a particularly difficult surface over which to travel. Even the city pavements are, as a rule, very hard on the three-wheeler and particularly so if the driver, as is often the case, attempts to follow one rail of the car line, allowing the third wheel to pound over the rough and uneven cobbles, either between the tracks or between the rails. For this reason, although the three-wheeled vehicle is very satisfactory on smooth pavements it is almost useless outside of the city on the rougher roads.

In Europe, the roads even outside of the cities and connecting the villages, are usually so well kept and originally laid that no such difficulties or disadvantages are encountered in using three-wheeled machines, their well-known lightness, economy of operation and low initial cost, as compared with even the smallest four-wheeled vehicles make them extremely popular.

Another feature which has also had its influence in bringing about the extended use of side and fore-car attachments abroad is the large number of two and three-speed gears which have for several years been on the market. These attachments have made it possible for even a machine of moderate horse-power to carry successfully the additional weight of the attachment and rider, so that it was not necessary to have a large and powerful machine before a more sociable rig could be used than the ordinary motorcycle. In this country practically none of these devices made their appearance until within the present year. It took considerable patience and perseverance on the part of an owner of a moderate powered motorcycle to cover any extended distance with the machine carrying double, with no means of falling back on a low gear and with almost invariably poor roads to contend with the minute the city's well-paved streets were left.

The third reason for the extensive use of three-wheeled machines abroad may also be the much longer period that motorcycles have been in use there and the much greater familiarity of the public with this, the cheapest of all methods of transportation. In all probability as our own public become more accustomed to the use of motorcycles and side cars, an increasing number will be used for light delivery work and for the more companionable outings where two can ride side by side. The gradual improvement in our road conditions, a movement for which, largely due to the extended use of motordriven vehicles, is slowly but positively

gathering strength, will also tend to increase the use of three-wheeled cars. After several years have made the public familiar with the advantages to be gained by the use of two and three-speed gears, these will be placed on nearly all machines and the riders will then be enabled to more successfully use side cars and surmount the difficulties of rough road travel. One thing, however, is certain, and that is that tri-cars and small three-wheel delivery vehicles will never reach such a stage of popularity as they now enjoy abroad until some very marked improvement has been made in both the city streets and the country roads.

THE 1909 "F. N." BIG FOUR

The accompanying cut shows the 1909 "F. N." Big Four, marketed by the Ovington Motor Co., 2234 Broadway, N. Y. City. The principal differences between this model and the 1908½ model, which was brought out at the latter part of last year, are as follows: Instead of an internal expanding drum brake and a rim brake which was formerly put on to comply with the law in Europe, the F. N. Company now fits the machine with an external contracting



The 1909 "F, N." Big Four.

band brake acting on the same drum as is used by the drum brake. The standard equipment is foot rests and pedals. The lever which lifts the exhaust valve has been changed from the right to the left grip and the lever which formerly lifted the exhaust valves now operates the band brake, so that if for any reason or other the foot brake is out of commission the brake may be applied from the handle The same engine is used, although there is a slight change in the pistons which are made much lighter, and there are also some slight changes made in the carburetor. The two-speed sliding gear transmission is furnished as an extra. Unusually heavy rims and spokes as well as very large tires are fitted on the 1909 machine.

Mr. Rose, of Grand Rapids, Mich., the first to do the "Globe of Death," has organized a motorcycle message and packet delivery service.

THE "L. & W." MOTORCYCLE - MOTOR

The "L. & W." 30-50 motor shown herewith is manufactured by Geo. W. Lyon, 170 33rd St., Chicago, Ill., and is intended to meet the demands for a high grade motor either for motor bicycle use or any purpose where a small light gasoline motor is required. The cylinder 3 15-16 inches in diameter by 3 1-2 inches stroke gives a capacity of 30.50 cubic inches.

The cooling fins on the head are of ample size as are those on the cylinder, which is machined all over, insuring even expansion and good radiating surface. The exhaust valve is 134 inches in diameter, and allows of a perfectly free escape of exhaust. The inlet valve is proportionately large, which permits of short lift, allowing it to perform its functions with the least possible noise and wear. The wrist-pin is of ample size, tooled steel, hardened and ground, with a % inch hole through cen-It is held in place by two cotter pins, one on each end, through hole drilled in the bosses in piston, the pins projecting into the hollow wrist-pin where the ends are spread, making it impossible to move pin until the cotters are withdrawn. The



The "L. & W." Motor, 30-50 cubic inches capacity.

connecting rod is 7 5-16, center to center, bushed with the best of bronze at each end; the lower end is solid, thereby obviating any chance of loose bolts or nuts in crank case. The fly-wheels are machined all over. The shafts are of tooled steel, hardened and ground, with a collar, or flange, which is made with a pressing fit in a counterbore on the outside of each wheel. They are then riveted through collar and wheel, making it impossible to have a loose shaft. They run in imported Hess Bright bearings.

The timing gears are sixteen pitch, twenty and forty teeth, % inch face. The cam is of ½ inch face, of tooled steel as is also the lifter, which is made as long as possible to insure a nearly direct lift to the push-rod; one end being carried by a stud, and the other end interposed between cam and push-rod. The exhaust valve lifter is entirely upon the outside

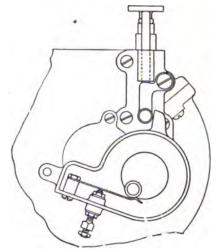
of crank case, in which place it is easily repaired in case of accident and prevents any leakage of oil through holes in case. The crank case is made from best grade of aluminum, held in place by eight bolts. It can either be enameled or finished bright. The crank-pin is of tooled steel, hardened and ground, with a taper fit in the fly wheel; the drive side of the shaft is made with a taper to carry either a sprocket or a chain drive, or a pulley for belt.

The motor weighs forty-three pounds. The head is drilled to receive a spark plug, either in the top or side as most convenient. Provision is made to thoroughly oil all parts of motor. The cap to inlet valve is so made that it can be turned in any direction, thereby allowing carburetor to be placed in any position, and is threaded with a ¾ inch, standard pipe thread. The Schebler carburetor is part of the equipment. The price of the motor is \$100.

1909 "GREYHOUND" MOTORCYCLE

The most essential change made for 1909 in the "Greyhound" Motorcycle is the special racing seat attachment seen in the accompanying cut, which involves no change in the rear frame construction. The saddle is mounted on the "Greyhound" shock absorber which consists of a spring packed telescope tube attached to the top connection of the frame by a pair of rocking arms and to the crank hanger connection by a swivel joint so that the rider

The transmission is by belt drive which consists of ¼ in. nickel steel chain completely encased in rawhide, the chain being used for strength while the rawhide acts as a buffer between the chain and the V pulleys. A ball bearing spring idler of new design is fitted. Single grip con-



The "Greyhound" Timer and Exhaust Lift.

trol is used, the connection between the grip and control box being by use of 1-16 inch piano wire carried through the handle bar tube. Ignition is by three No. 6 dry cells carried in a box. The control box



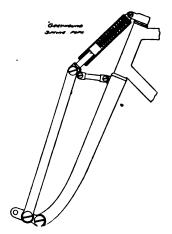
The 1909 "Greyhound."

is suspended on a spring adapted to his weight, and can negotiate cobble stones or any kind of rough roads at any speed in comfort.

The motor is full 3 H. P., hung low and in excellent position for cooling and for comfort of the rider. The cylinder and head are cast in one piece and the carburetor is bolted direct to the cylinder head serving as a retainer for the inlet valve. This carburetor is of the float feed type. A small convenient device known as the flusher tube is furnished for priming the cylinder, the use of which assures easy starting of the motor when cold.

or spark control is dust proof and fitted with outside adjustment for contact points. The box contains a single spring, contact being accomplished by cam revolving on the crank shaft, the latter being a single piece steel drop forging, carefully hardened and ground. Extra large phosphor bronze bushings are fitted in the crank shaft bearings as well as in the connecting rod bearings giving ample adjustment for wear. Tires 2½ inches in diameter are furnished as regular equipment. The spring fork shown herewith gives 2 in. spring compression.

range of frame movement for an inch of



Sectional View of the Spring Fork used on the 1909 "Greybound."

The standard finish of this machine is in silver gray enamel ornamented with blue. The rims are of hollow steel. The equipment includes a 6 quart gasoline tank, Corbin hubs, mud guards, strong and convenient stand and full set of tools.

THE "TORPEDO" TANDEM ATTACH-MENT

The Hornecker Motor Mfg. Co., of Genesee, Ill., have just gotten out a new tandem attachment, cut of which is shown herewith.



The "Torpedo" Tandem Attachment.

The principle of this attachment is that it is suspended on springs the same as the Hornecker front spring fork. This spring suspension entirely eliminates all jarrings and thus allows both riders to ride comfortably. The attachment can be fitted to any motorcycle in about ten minutes. It lists at \$15.00 less saddle.

The Syracuse Motorcycle Club has arranged for the following runs this summer: June 4th, blind run; June 13th, request run; June 20th, Utica; June 27th, Auburn; July 11th, Sylvan Beach; July 25th, South Bay.

"SOLAR" MOTORCYCLE HEADLIGHT AND GENERATOR

The Badger Brass Mfg. Co., of Kenosha, Wis., has placed on the market a gas headlight and generator designed specially for motorcycle use. The general construction of the headlight is of same design and construction as their motor car lamps. It is made of heavy brass reinforced and riveted in assembling. It is 6 inches high



The "Solar" Motorcycle Headlight.

and 4½ inches long. A powerful 4-inch lens mirror reflector is fitted, together with front glass and 5-16 ft. tip. The lens mirror reflector can be removed if desired. The headlight is made for standard flat bracket, which fits in a casing concealed inside the back of the single piece body. The lamp is held fast to bracket by means of a set screw.



The "Solar" Motorcycle Generator.

The generator is made of seamless drawn shells of heavy brass. The carbide capacity of the generator is ten ounces. The generator is 8½ inches high and 3½ inches in diameter. The bracket lugs are a part of the generator, which simplifies attaching with various brackets to any motorcycle.

Because of the twenty different makes of motorcycles differing so radically from each other, the manufacturers of this headlight are obliged to produce a special bracket for each make. The lamp, generator and bracket complete to fit any motorcycle list at \$10.00,

"M. & M." N'OTORCYCLE REPAIR KIT

The M. & M. Mfg. Co., of Akron, Ohio, have prepared a motorcycle tire repair kit especially designed for the motorcyclist. This kit is packed in a tin screw



"M. & M." Motorcycle Repair Kit.

top box containing a special prepared cement, an assortment of patches, cement brush, emery cloth, etc. This kit can be carried in the tool box without any danger of being crushed or broken. The cement used in this outfit is claimed not to soften sufficient to allow separation under the most severe conditions.

A NOVEL MOTORCYCLE REPAIR PEDAL

The Adams quick action motorcycle repair pedal illustrated herewith is manufactured by the Henry T. Adams Co., 6846 South Park Ave., Chicago, Ill.



Patent applied for

The "Adams" Quick Action Motorcycle Repair Pedal.

This repair pedal is small and light so that it can easily be carried in the pocket or tool bag, yet it is so constructed that the machine can be pedaled without wearing out the shoes, neither will the feet slip off sideways. It is flattened to take a wrench and plated to prevent it from rusting. The list price of the pedal is 35 cents.

The N. S. U. Motor Company, 206 West 76th street, New York, has established agencies with the following: Gus Habich, 142 East Washington street, Indianapolis, Ind.; Louis Flescher, 1622 Capitol avenue, Omaha, Neb.; G. de Gruchy, 1243 North High street, Columbus, Ohio; Clarke Motorcycle & Auto Repair Co., 1814 Chestnut street, St. Louis, Mo.; M. B. Glason, 107 Post Office court, Minneapolis, Minn.; Merridith & Guthrie, 63 W. Third street, So., Salt Lake City, Utah.

THE "GREYHOUND" FIRE FIGHTER

The Auto-Bi Company of Buffalo, makers of the Greyhound motorcycle, are developing the possibilities of the motorcycle along various lines, one of the most interesting of which is the adaptation of its use as a means of delivering efficient apparatus and a skilled operator at a fire in a hurry.

The accompanying cut shows a Greyhound motorcycle equipped with extinguishers which are mounted in spring brackets on each side of the rear wheel in such a way as to be instantly released



by throwing a cam lever, enabling the operator to snatch them out in no time at all. The machine is equipped with an automatic stand which takes care of itself when the machine is pushed off and with a loud voiced alarm bell for the purpose of warning traffic.

For several weeks past the man and the machine have been stationed at Chemical No. 5 house in Cleveland avenue, Buffalo, responding not only to alarms from the district covered by Chemical No. 5, but to nearly all other alarms in the city.

In the most of cases, irrespective of distance, the machine has arrived before the department apparatus, and in several cases the motorcycle firemen killed the fire before the regular department could get into action. As a case in point, on April 25th there came an alarm from Bird avenue and Hoyt street in response to which the motorcycle traveled 6580 feet, about a mile and a quarter, and the fire put out while the crew of Engine No. 19, which had to travel only 1800 feet, were coming up the stairs.

In another case, the little two-wheeler ran 7400 feet and had first water on the fire, arriving about the same time as Truck No. 4, which traveled 3000 feet. The distances quoted are from the official city maps.

A recent decision of the Michigan Supreme Court will necessitate motorcycle owners in the future to carry the same lamp equipment as automobiles. They will be compelled to show two lights in front and the usual red light in the rear. They will also have to register and display their license number, in front and rear.

Answers to Motor Cycle Questions

(We desire not only our readers to make full use of this department, but any one who disagrees with the opinions have in expressed.)

HÓW OFTEN SHOULD MOTORCYCLE CYLINDERS BE CLEANED?

Will you please answer the following in your next issue of the Journal:—

How often do you consider the cylinders of a motorcycle engine should be burned out? What is the best way to burn them out—the best way to remove carbon from the cylinders?

Would you recommend using lubricating oil in the gasoline for an air cooled motor?

I am a constant reader of your Journal, and always look forward to the next issue.

WEAVERVILLE, CAL. W. A. DAY.

The cylinders of a motor cycle which is used daily should be cleaned at least once a week by using a half teaspoonful of kerosene in them in the morning before starting. If the kerosene stands a little while in the cylinders it will help to remove the carbon and burned oil deposits. Run the motor after the kerosene has stood some time. When cylinders are very foul the best way to remove the dirt, for a large part of so called carbon is simply road dirt mixed with the residue of burnt oil, is to take down the engine and scrape the piston head. The use of good carbon removers, liquids, which are usually left in the cylinder over night, will probably postpone the time of having to take down the motor for more thorough cleaning.

Lubricating oil in the gasoline is only successful when the motor is of the two cycle crank case compression type. In a four-cycle motor this method is not advisable.—Ed.

MOTORCYCLE RECORDS AND DRY CELLS IN PARALLEL

[383] Will you please answer through your columns the following questions:

1. Are the following records of G. H. Curtiss of Hammondsport, N. Y. official?

8 cylinder, "Freak," 1 mile, 26 2-5 seconds.

2 cylinder, 16 cu. in., 1 mile, 46 2-5 seconds.

1 cylinder, 30 ½ cu. in., 1 mile, 56 1-5 seconds.

These were supposed to be made at Ormond Beach, Fla.

- 2. Is Ormond Beach Track straight or circular?
- 3. Which can make the best time on a circular track without danger of skidding into the fence, a motorcycle or an automobile?
- 4. What is the advantage or disadvantage of connecting dry cells in parallel?

 FOSSTON, MINN. HENRY A. BERG.

I think the records claimed are not official but I believe they are correct. Records do not interest me much. The Ormond Beach is practically straight. It is not a track but is a stretch of natural beach on which the sand is very hard and

able to support heavy rigs with practically no track.

The motor cycle can be built to make the fastest time on a straight-away because it has the least wind resistance but on a track the probabilities are in favor of the auto. The cycle loses its stability if it skids and this requires the rider to take less chance if he felt sure of not upsetting

Dry cells are not like a ton of coal. The faster they are used the less there proves to be in them. If you take out but a half unit at a time they wll last three times as long as if you take out a whole unit at a time. This may not be strictly the ratio but by light using they may give 50 per cent. to 80 per cent. more current. A coil must have a certain voltage and amperage. More voltage burns the points. More amperage will not pass through without more voltage. So if two sets of proper voltage are connected in parallel each set will supply half the needed quantity of electricity and last 3 times as long as if one was supplying it all. Three and four sets are more favorable. The only disadvantage are the large number of connections to keep track of, the weight and cost of the cells and the danger of wiring them up wrong if careless.—C. E. D.

COMMUNICATION, HOW TO INCREASE POWER OF MOTORCYCLE ENGINE

I notice in your February issue question No. 236, page 270, by Geo. D. Tucker, asking information about auxiliary parts he wished to place in an Indian motorcycle. The answer given by C. E. D. came a long way from being complete or comprehensive. Having made exhaustive experiments with high compression and auxiliary exhausts, will give the results for the benefit of your readers.

My experience with the ordinary 31/2 to 4 H. P. motorcycle is that the stock machine with low compression will average about 35 miles per hour on a good dirt road. This can be increased to 55 or 60 miles per hour by increasing the compression to the maximum and placing auxiliary ports. This can be done by reducing the compression space to 25 per cent, of the piston displacement and regulating the lift of the intake valve to 3-16 in. The best way to do this in a motor with separate cyl. head is to cut off bottom of cylinder so piston protrudes through top end of cylinder to middle of first ring. Then bore out your cylinder head 1-100 in. larger than cone of cylinder, a sufficient depth to allow 3-32 in. clearance for piston on top centre. This change, if motor is in good condition, will give about 15 per cent. increase in speed and power. Your motor will not heat and will be fully as flexible as before change. Do not use the auxiliary



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exhaust without first getting high compression. For a 34x34 single cylinder use 12 3-16 holes for your auxiliary exhaust. Centre the holes so your exhaust valve lifter will come up hard against end of exhaust valve stem when the piston has uncovered 1-16 in. of holes; in other words, give auxiliary exhaust holes 1-16 in. lead on your exhaust valve. Now you must have all lost motion taken up in your valve lifting cam and push rod, allowing only the necessary clearance for expansion before you lay out the holes. After the auxiliary exhaust is installed you add 15 per cent. more to your speed and power, making a total of about 30 per cent., but you have more vibration. You will have to readjust the carburetor to compensate for the induction effect of air on the suction stroke. Do not pipe holes to muffler or you will lose fully half of the gain. At high speed this materially helps to fill the cylinder, the induction being air which can be made explosive by feeding a little richer mixture through the carburetor. piped to muffler the induction will be exhaust gases which cannot be made explosive and are a detriment. You now have all that is possible to get out of a 4-cycle You will lose about one-half of motor. the oil out of your auxiliary holes and in consequence will use double the amount you did before; but there are some advantages.

CO. BLUFFS, IOWA.

C. D. BROWN.

MAKING A MOTORCYCLE MAGNETO [375.] I am about to make a magneto for my motorcycle and would like you to answer a few questions for me, being a subscriber. I have a one-cylinder machine and have gears to run the magneto at camshaft speed. This is to be a high-tension magneto and I know it will be a job to make. What size primary wire, also secondary wire, and how much of each shall I use? I expect to have a shuttle-wound armature. Will 36 pieces of tin foil 2 x 3 and insulated from each other by wax paper, be suitable for condenser? How shall

I connect the tin-foil to the wire? CAMDEN, N. J. CHAS. CUSHMAN. I fear that answers as to size and amount of wire you need would lead you astray. The amount of space on the armature must be considered, the speed of the magneto and similar features. And I am not a magneto builder. So my advice would be worth little. Primary wires are usually from 18 to 22, while secondary is fine as may be had, 36 to 40. Your condenser plates sound small to me. The tin-foil should be narrower than the paper, but same length. The odd foils are allowed to project at one end and the even ones at the other. Pinch them together at these ends and solder the wires to them. If they project one-half inch there will be a half inch of paper at the other, which makes the insulation.-C. E. D.

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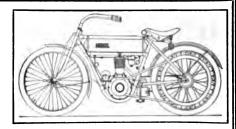
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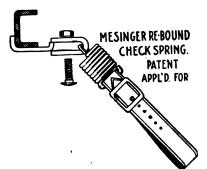
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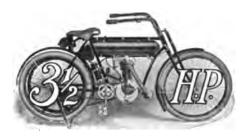
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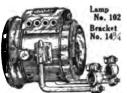


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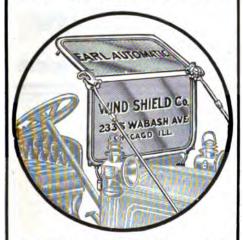
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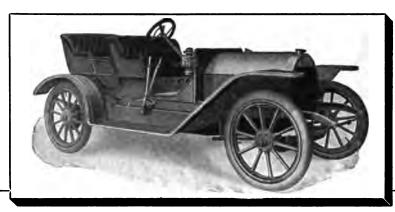
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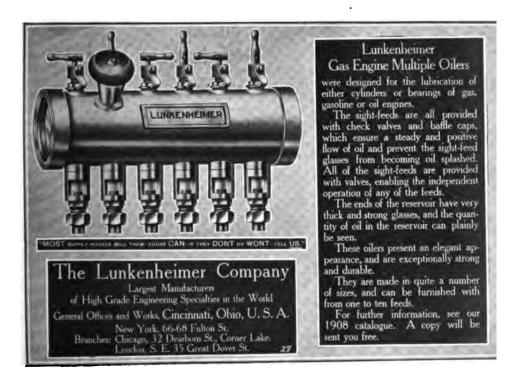
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First in two-mile stock chassis; time, 1.34 2-5, \$3000 and over class.
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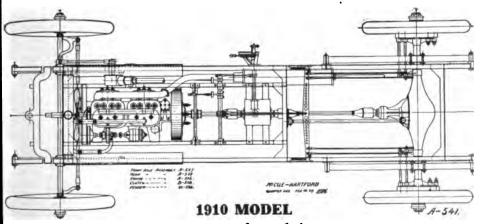
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Joints, will run 3000 to 5000 miles with one
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Prices sell our goods. Let us figure with you on your
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SPICER UNIVERSAL JOINT MFG. CO. 15 MADISON AVENUE : : PLAINFIELD, N. J.

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CHASSIS:—Furnished in any stage of completion.

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A X L E S :- Floating Rear Axles, the housing of which is made of sheet steel, welded laterally.

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Your Bank Account Remains Unchanged

From
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This Car



\$350

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The Metz Plan Car

My novel selling plan brings this car within reach of all. It makes it easy for you. It is practical. It is liberal. What is this Plan? Book G fully explains.

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We are specializing in the Forging of High Nickel Alloy for this purpose.

We are Succeeding—Present orders prove Material Right—Workmanship Right—Prices Right.

Ask for list and prices of over one hundred stock die sizes. We also make Drop Forgings generally.

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Have you ever given our method consideration? ¶ Don't let yourself become discouraged about ELECTRIC WELDING because you may have had some unfortunate experiences with parties not capable of applying the process, but GIVE US A CHANCE to show you what can really be accomplished by the art of electric welding in the hands of the masters of the process. Write for Booklet "C" illustrating a number of interesting objects electrically welded.

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The RUNG AUTOMATIC TIRE PUMP

You can inflate your automobile tire in less than two minutes, through the car's own power. Can be operated at any speed. Isn't this an improvement over the use of a hand pump?

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THE clide is the first car perfect in sise, in mechanism and in action that has ever been offered to the public at a correct price.

Many years of automobile building are back of every clide. Years of truttul experience that have added to the merits and popularity of CLIDE cars.

The power plant is a 4-cylinder (cast separately 45 actual H.-P. motor. The crank shaft has 5 bearings,—as it should have.

A constant level offing system aliminating priving and

should have.

A constant level offing system, eliminating plying and automatically maintaining the proper level of oil in the crank case at all time.

An improved form of selective type of transmission, located just forward of the rear axie, reducing the angularity of the propeller shaft.

A rear axie with liberally proportioned parts, and of a construction that gives an absolute assurance of perfect work.

work.

A multiple disc clutch with discs of large diameter.

Double set of brakes—internal expanding and external contracting. Brake drums are 16 is. is diameter, 3-in. isco—will hold the car on a mountain grade. Absolute confidence in ability to slow down or halt at will is established when Glide brake equipment is examined. No brake system on any American or Foreign car has ever before been so comprehencively treated.

One Universal Joint only in GLIDE cars, ocated be-

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34 x 44-in. In the all around—wheel base 120 in. Remember, three are all alike, not 34 x 4-in in front and 34 x 44-in in the rear, thus obvisting the ridiculous necessity of carrying two sises of spare casings and tubes.

The GLIDE is not an assembled car. It is built in our own shops, the motor excepted.

The GLIDE cars are sold before dealers buy them. Buyers know that Glide cars at \$2,250 and 2,500 are better cars than they can get for the same money anywhere else. They know not only because of our extensive Glide advertising, but also because of Glide demonstrations and widely increasing sales.

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wrony increasing same.
Our advertising helps you sell Glide cars—and every sale brings another sale to you.
Our position is the one all manufacturers must take sooner or later—giving full value for the price.

We have open territory for live progressive dealers who want a permanent business built on the growing popularity of the dide.

Write today for 1909 agency contracts and proof that is Glide agency is the best proposition you were ever

GLIDE ROADSTER MODEL "R"—SAME CHASSIS—WHEEL BASE, 106 INCHES—36 x 4-in. TIRES ALL AROUND, with either CLOSE COUPLED BODY, seating four, or RUNABOUT BODY, seating two-\$2,250

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THIS SHIELD WILL **COST YOU**

Made in a most substantial manner.

Mahogany filler; heavy plate

All brass bound and all brass fittings.

A shield that would have cost double this amount if bought a year ago.

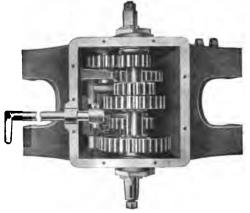
Two sizes: Runabout and Touring Car. Both same price.

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BROWN-LIPE GEARS

Transmission—Differential—Steering



Differentials Steering



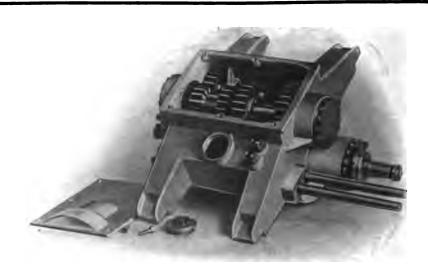
Timken roller bearings are used as our regular equipment for transmissions.

Direct Factory Salesmen:—K. Franklin Peterson, 166 Lake St., Chicago; Thomas J. Wetsel 29 W. 42nd St., New York City.

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SELECTIVE TYPE AUTOMOBILE TRANSMISSION GEARS. STYLE 39V, 50 H. P. AND LOWER

Made in both vertical and horisontal types and fitted with annular ball bearings, as specified.

The gears are made of chrome nickel steel, hardened, treated and ground to size; the shifter rods are fitted with an automatic inner-lock, making it impossible to mesh two gears at one time; the rods are also fitted with registering pawls to automatically lock sliding gears in and out of mesh. All parts are interchangeable. We make many other different types transmission to fit any ear. Our work is of the highest type only. Write us for prices and detailed information.

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If interested in the most powerful line of motors ever produced, considering weight where bearing surface and strength have not been sacrificed, write for circulars

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Double opposed motors built in two sizes, 5 x 5-18 H. P. and 5 x 7-24 H. P. Four cylinder motors in three sizes, 4 x 5-30 H. P., 4½ x 5½-40 H. P. and 5 x 5½-50 H. P.

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EASTERN AND FOREIGN OFFICE:
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SCHLOSSER MFG. CO. MOTORS



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Low Price & High Quality

THE FIRST 4-cylinder car on at \$1250. the market FIRST to demonstrate to the American public the reliability and durability in the mid-winter runs and hill climbs that this wonderful car has entered into.

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We have a little unassigned territory. If you are looking for a line that will sell on sight, write us today for our agency proposition.

THE CAR THAT HAS MADE GOOD. EVERY PART OF REGAL CARS machined and assembled in our own shops.

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Horsepower—30. Engine—4-cylinders, 4-cycle, Vertical type. Crankshaft—Single piece forging, especially heat-treated, large bearings with flywheel, flange forged integral on crankshaft.

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Steering Gear-Irreversible. Worm and Sector type

type.
Wheel Base—105 inches.
Lubrication—Circulating and Splash System.
Ignition—Dual System, consisting of Remy
High-Tension Magneto with distributor and
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batteries with double-throw switch on coil.

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Baker Electric Vehicles are made in the great Baker factory—the largest of its kind in the world—where quality, durability and efficiency are built into each Baker.

A Few Baker Features Are

Unequaled economy in the use of Riectric Current. Batteries in series at all speeds. Longest life of the battery. Quiet center-chain drive. Perfect alignment under all conditions. Lowest transmission loss. Rxide batteries standard equipment.

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Gentlemen's Runabout—(The Electric sensation of 1909.)

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Nowhere else can you get our quality at our prices. An inspection will prove this.



FOLLOWING ARE SOME OF THE ARTI-CLES WE MANU-FACTURE:

SIDE DOOR HANDLES
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and many other useful articles.

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"EVER READY" SPEEDOMETERS

Best for Car Owner and Best for the Dealer to Sell



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TOUROMETER, \$25
Trip and Season Odometer
An 80-Mile Tourometer
At \$30.00





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WE MAKE THE SMARTEST **Up-to-Date Ignition Coils**

Distributor Coils, Box Coils and Foot Switch Coils for Dual Ignition

Multiple Unit Trembler Coils, also Master Vibrator Coils

Licensed under Varley and Williams Unit Coil Patents Miller and Dow Master Vibrator Patents also

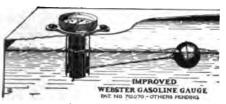
Varley, Brigham and Lawton Buck Proof Coil Patents

Safety Spark Gap on every Unit Friction Adjusting Screw (No Jam Nut) Our Multiple Unit Coils are waterproof and contain no external binding posts Our Dash Coils are the smallest made and each unit has the full amount of Primary and Secondary Winding

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JERSEY CITY, N. J. Licensed by the Unit Coll Co.

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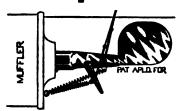


Abolishes the "thin stick."
Avoids danger of explosion.
Assures clean fuel.
Shows tank contents at a glance.
Attached without solder.

Price, \$4.50

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The Exhaust Blows It

Attaches to muffler.
Will not clog.
Simple—Practical.
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\$6, \$8, \$9, \$10, according to engine used.

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The manufacturer who needs castings should insist upon

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Each business must have castings adapted to some special requirement. Our experience and equipment are combined to produce exactly what you need.

ALUMINUM for lightness and durability.

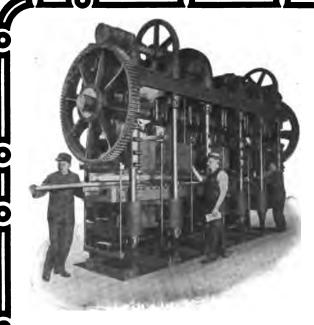
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"A" METAL for Engine, Dynamo, and Motor Bearings.

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A Side Bar in the Twinkling of an Eye

The successful quantity production of pressed steel automobile frames depends primarily upon adequate press equipment. Our splendid line of side bar presses has a capacity of over 100,000 pairs of bars per annum. You want the best possible service—we are equipped to give it you. Let us quote on your 1910 frames.

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HARDENED CONTINUOUS ZIG ZAG TREAD CHAIN

A Chain That is RIGHT At a Price That is RIGHT

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Kindly send us your name and address so we can place you on our new mailing list.

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STYLE A—Our well-known yoke and center-block pattern, noted for its great strength and durable qualities. Made in all sizes up to 3 inches.

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The Bongartz "AUTO-LOCK" prevents unauthorized use of automobiles.

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The "AUTO-LOCK" is a necessity for every automobile owner who cares anything about his machine.

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For sale by ALL first class Dealers in Auto Supplies



3-Point Suspension

Valves in Head

Price, \$2,500

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Mr. Manufacturer:

There is one line of wrenches that you can buy with safety,---the

Frank Mossberg Co.'s WRENCHES

They have a long established reputation back of them. The "Series A," bearing this trade-mark, are especially adapted for automobile use. They are neat, strong, thoroughly case hardened, made to withstand hard usage and

Every One Is Guaranteed

These are surely the wrenches you want to include in your equipment, especially when they are inexpensive.

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Costly Construction

The improvements on the National from year to year constitute a very good history of motor car development. It has generally been somewhat in advance, but its departures have always soon become standard practice with the best manufacturers.

In the introduction of the all-ball-bearing motor, however, only a few of the highest priced cars—all costing much more than the National—have followed it. It is expensive construction, but no expense is spared at any point to make the National the best.

Four Models--Fours and Sixes --from \$2,750 to \$5,000.

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SPARK PLUGS

are a most important necessity in your motor. Then why not buy a plug that has a reputation and is as simple as the RELIANCE? Especially good features are found in RELIANCE PLUGS that make these differ from the ordinary. "THEY SPARK IN WATER."

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We will protect all users of and dealers in any of the plugs we manufacture against any litigation regarding the Mueller & Canfield patents.

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EDISON DOUBLE SYSTEM SPARK

designed for those desiring a dual system of ignition, but have only provision for one plug in each cylinder of their motor.

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For Diamond, Baldwin and Whitney Roller and Block Chains

in three sizes.

Sprockets, Chains and Differentials carried in stock and to order.

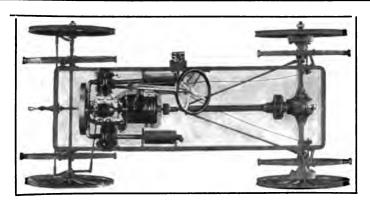
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Complete Chassis for the Buggy Trade



¶ A splendid opportunity for the Carriage Manufacturer to get into the Automobile Business without great investment. All that you have to do is furnish the body and trimmings, we do the rest. No experimenting. A perfect automobile, built on standard lines. Full particulars on application.

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The Only Inner Tube GUARANTEED Against Repair

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With every sale of a
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to be used in

PENNSYLVANIA CASINGS will go a guarantee for the purchaser against all expense for its repair during the entire year of 1909 unless the damage results from driving on deflated tires.

To give this unprecedented motoring economy the broadest possible convenience for motorists, all punctures, cuts, etc., within the terms of this contract will immediately be patched, free of charge, at the nearest of our agencies throughout the country, and prompt return of tubes made. List of these agencies on request.

The advantage to the dealer, in the sale of our goods, afforded by their quality, backed by this guarantee, deserves more favorable consideration than any other proposition in the tire market.



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It's a Quality Car The Speedwell Finds Favor Because

The country is crowded with makers of automobiles whose one aim seems to be to make a 'showy' car at a low price. When we entered the automobile field it was our aim to make the best possible carstill doing this to-day.

Every Ounce of Material the Best

There are a few larger cars on the market and many that sell at a higher price than the Speedwell price \$2,500, but no car, irrespective of the price, has in it between the sell shade the Speedwell, for in the Speedwell, every ounce of material is the best destinable.

Standard Will Be Kept Up

Low Maintenance

THE SPEEDWELL MOTOR CAR COMPANY, DAYTON, OHIO

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THE B. & S. IGNITER

Would you like to equip your 1910 cars with the most efficient, compact, simple and troubleproof ignition system ever devised?

The B. & S. Igniter has many absolutely new and exclusive features, and manufacturers should investigate it thoroughly before closing contracts for 1910 ignition equipment.

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MR. DEALER:

Are You Handling the Pittsfield Line of Ignition Goods?



If Not, Why Not?

It is a Line that You can Stand Back of and we will Stand Back of You and the Line with the broadest possible Guarantee in every particular.

The Pittsfield Line is the Line that sets the Standard for Efficiency, Durability and Economy.

It is up to every Dealer in Ignition Goods to supply automobilists with the best there is to offer. An unsatisfactory Ignition System makes automobiling unsatisfactory and expressive. Pittsfield Ignition Systems give the maximum power of the motor, the greatest fuel efficiency, unequaled economy of operation and an entire absence of ignition troubles. It is up to every Dealer to handle the Pittsfield.



PITTSFIELD SPARK COIL COMPANY, DALTON, MASS.

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National Coils and National Spark Plugs



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Insure Efficiency, Reliability, Economy and Quality

The COIL that holds the world's record for non-stop runs, 4,492 miles on Reo Car. Also on the Pilot Car in the New York to Paris race.

Question: Why was the NATIONAL

COIL used?

Answer: RELIABILITY.

WE ARE THE MAKERS OF THE RELIABLE NATIONAL BOX COIL

NATIONAL COIL CO., Incorporated

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Crankshaft Insurance



You can insure your product, as well as the life and limbs of your customers, by getting your crankshafts from a responsible manufacturer. We have been specializing on this particular part for many years, and are prepared to offer you crankshafts that,—so far as human ingenuity and skill can devise,—will stand up under the repeated stresses and strains to which this part of the car is subjected.

Just send us your blue prints and state quantity desired. We will be pleased to quote you on any number.

Standard Connecting Rod Co., Beaver Falls, Pa.

NO MORE FINES

For Driving without your Tail Lamp Lit

If you equip your car with one of Ham's, and it will save you a great deal of trouble, annoyance and expense. The Vigilant, illustrated herewith, is our most popular tail lamp, it is absolutely wind proof, will not jar out and can be relied upon to stay alight under any and all conditions. Beside the red light for rear signal,



it gives a powerful white light, and the rigid handle makes it very handy and convenient for inspecting engine or car in case of a break down. It is fitted with our new Safety Locking Handle, which does away with the constant annoyance of losing your lamp or having it stolen.

Write for our new catalogue, it will interest you. Address Dept "D."



· HAM'S VIGILANT TAIL AND INSPECTOR LAM!

C. T. Ham Manufacturing Co. ROCHESTER, N. Y.

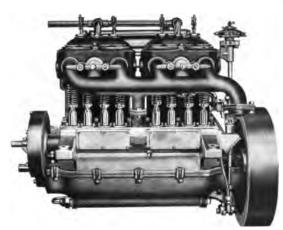
High Grade Beaver Motors

Work Like Beavers-Silent, Sure, Satisfactory

6 Cylinder Vertical, 4½ x 4½
4 Cylinder Vertical, 4½ x4½ and
4½ x 5½
2 Cylinder Horizontal Opposed, 4½ x 4 and
4½ x 4 & 5½ x 4½
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Centre Crank Oiling Device

All Motors are Four Cycle



The 4 Cylinder Horizontal Opposed Motor is Designed Specially for Commercial Trucks.



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Beaver Mfg. Co., 783 Chase St., Milwaukee, Wis.

"SELECTIVE SLIDING"-35 and 50 H. P.



1909 TRANSMISSIONS AND PARTS



For Timken Roller Bearings and Annular Ball Bearings

Gears are made from special Gear forgings, hardened, ground and "treated." We also furnish "selective" control levers. We build both spur and bevel types of differentials. OUR STEERING GEARS are built to "stand up" under all conditions.

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THE NEW UNTERBERG & HELMLE MAGNETOS

TYPES LD and CD

contain certain special features making them particularly desirable where a battery is desired for starting purposes.

The battery timer is incorporated in the magneto at the end of the distributor shaft. The same movement of the spark lever advances both the interrupter and the timer. The distributor is so constructed as to escape the burning usually caused by high tension sparks when the motor is started on the switch.

The interrupter is of a new U & H design, combining extreme simplicity with indefinitely long life. It is absolutely devoid of adjustment, and meeds only to be let alone. We consider it one of the most notable of recent magneto improvements.

TYPE LD, for large motors; price, complete with battery coil and high tension switch, 4 cyl., \$150; 6 cyl., \$175.

TYPE CD, for small motors; price, complete as above, 4 cyl., \$125; 6 cyl., \$150.

We still order the U & H Types LB and CB, which are similar to LD and CD but without battery auxiliary, and the well-known Type LE—the Self-Starting Magneto for large motors.

J.J.BRETZ COMPANY

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Investigate the Merits

OF

The Stein Pneumatic Auto Tire!

IT WILL BE WORTH YOUR WHILE!

If The Stein Pneumatic Auto Tire shows a long step in improved construction, over tires made for the last ten years. It embodies all the good merits without the faults of the Popular Price Tires, in addition to exclusive features of its own.

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q Requires no lugs or stay bolts. No pinching or chafing of inner tubes, which causes 75% of the punctures. One extra ply of Sea Island fabric and heavier tread adds 35% to life and strength. Write for the "13 REASONS," and prices.

The Stein Double Cushion Tire Company
Sold by Responsible Dealers
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The PICKARD RUNABOUT is an excellent proposition for the dealer. It sells on sight. Write for particulars.

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PICKARDS are also made in the following models:

Rumble Seat, Model F, \$800. Surrey, Model G, \$825. Touring Car, Model H, \$850. Model A, \$1400. Model B, \$1400. Model C, \$1450. Model D, \$1500.

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Brockton, Mass.



GILL FORGED CRANK-SHAFTS

The P. H. Gill & Sons Forge and Machine Works, Lorraine and Otsego Streets, Brooklyn, N. Y. We wish to call the Trade's attention to our Chrome Nickel Steel Crank-Shafts and Gear Blanks, etc., Domestic and Foreign.

NO DROP FORGINGS

We have special adapted Crank Pin Machines for making Crank-shafts true-round within one-quarter-thousandth of an inch. We also make axles complete, finished or forged only; also all kinds of automobile and marine forgings.

Crank-shafts up to 6" dia. All anvilforged, hammered out of Acid O. H. Steel or Nickel Steel or Chrome Nickel Steel.

G&JIRES

Chosen by Experienced Motorists as the Most Successful Solution of the Tire Question.



Proven by Actual Service to be the Strongest, Safest and most Economical Tire to use.

Write for Prices and Catalog

G & J TIRE CO., Indianapolis, Ind.

Detroit, Chicago, New York, San Francisco, Denver, Buffalo, Philadelphia, Los Angeles, Minneapolis, Omaha, Atlanta, St. Louis, Boston, Portland, Ore., Kansas City, Cleveland Pittsburg Toledo.

Automobile Tires

Clincher and Quick Detachable

All New Goods, all High Grade Makes. Small Ad, Small Prices. Money Refunded at once if dissatisfied on receipt of goods. We are not going to tell you that we have contracts with Factories, for they are well able to sell their goods themselves. Our PRICES do the talking. Your money refunded, provided you do not use the goods. Before buying elsewhere let us give you expert information on tires. We are in the business 15 years. Even if you don't buy from us we will be glad to correspond with you. Will give you the best of our advice.

								Shoe	Tube
28 1	21/2							\$ 6.50	\$2.00
	21.							6.00	2.00
28 z	3 -							9.50	2.25
30 z	3							10.00	2.50
34 1	3							8.00	2.00
36 1	3							10.00	2.00
30 z	31				i			13.00	3.00
32 1	: 3₹							14.00	3.50
34 1	3⅓			Ċ				14.00	3.50
36 1	31/2							12.00	3.00
30 1								16.50	3.50
32 1	4							17.00	3.75
34 :	ι 4							19.00	4.00
36 1	4						-	17.00	3.50
32 1	41/2						_	15.00	3.50
34 :	41/2							19.00	4.00
	41%				·		·	19.00	3.50
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Special Tires to fit 30 x 3 Clincher Rims, Brand New Shoe and Tube complete, \$6.50 each.

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Near Chambers Street
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LITTLE ONES AND GREAT BIG ONES



SAFE, SURE, LEAKLESS GASOLINE IS DANGEROUS



CHEAP "DON'T CARE" CARS USE CHEAP "MAKESHIFT" TANKS

TANKS



THE KIND THAT DON'T BREAK





Let Us Figure on your Body or Seat Irons for 1910 Models

Cortland Forging Co. CORTLAND, NEW YORK

SCREW MACHINES

FOR RAPID AND ACCURATE WORK - - - MULTIPLE SPINDLES FULL AUTOMATIC SINGLE BELT OR MOTOR DRIVEN

SEVERAL of the largest and best equipped Automobile Plants have given us repeat orders for from two to six machines during the last few months.

¶ The new Independent Electric Drive is found to be especially adapted to use where floor space is at a premium.

The ACME completes parts usually rehandled, and makes more first-class work per day than any other machine and at a lower cost per piece. It takes the same floor space, but it's faster. It takes the same attention, but it'll do all the others do and the extras, too.

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Those Detachable Links



can be taken a part anywhere without special tools; they make a neat appearing chain, narrow in width and above all a chain that lasts.

You can subject the Diamond Deta chable Chain to hard knocks, steady heavy pull or intermittent jerks at high speed, but the pitch will not elongate noticeably, nor will any other part show un-

due wear. This is due particularly to the fact that we use only such special steels, prepared exclusively for us, as will give the longest and most satisfactory service. We further insure long life by reaming the holes in the side bars to make a perfect bearing contact with the rivet throughout the thickness of the bar.

After one trial of the Diamond Detachable you will consider it at the head of its class, for the construction, like that of other Diamond Chain is scientifically and practically correct.

Diamond Detachable Chains cost no more than riveted chains and the links of both are interchangeable with each other.

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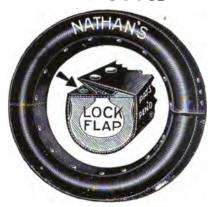
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Auto Fabric Supplies are "THE STANDARD"

Nathan's Lock-Flap Tire Cover



Lock-Flap makes it waterproof when placed in any position.



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This LOCK will protect your tires and tire trunk from being stolen. Adjustable to any size tire.

Tire Covers, Tool Rolls, Inner Tube Cases, Lamp Covers that fit, Top Covers, Dust Covers, Storm Covers, Auto Trunks, Pat. Leggins, etc. Everything made of fabric for the auto.

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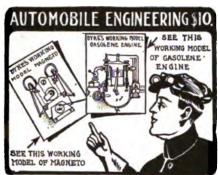
Mr. Garage-Man, Type C vulcanizes new canvas DIRECTLY to inside of a casing, makes the tire STRONGEST in repaired part, costs less than 1½c.

to operate and is the lowest in price. per hour

Auto-Owners—Let us send you complimentary copy of famous tire hand-book, "Care and Repair of Tires"

Write .To-day for Money-Making Booklet, "Put the Money in the Cash-Drawer"

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DYKE'S Course of Everybody Needs Automobile Instruction

AUTO OWNERS, save repair bills. CHAUFFEURS, make yourself more valuable. BEGINNERS, study first—driving is easy, but when things

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A CUSTOMER SAID—"I've worked around gasoline engines
for several years, but I learned more in three weeks than in all
that time."

for several years, but I learned more in three weeks than in all that time."

ANOTHER—A Doctor, said, "I knew nothing of the auto when I began your course. I believe I can now set valves, time the ignition and set a Magneto, to say nothing of other valuable pointers gained, etc."

THE simple LESSONS and clever WORKING MODELS do

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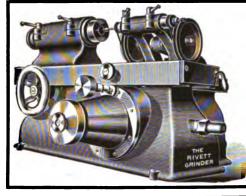
IT'S INTERESTING—You will play with these models as a boy would play with a toy—and the more you play, the more you learn.

SATISFACTION GUARANTEED—It is sent on trial.

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Complete course sent at one time.

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Have you any

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Invented more than seven years ago.

Right up to the minute for present-day ignition systems.

Adapts itself both to battery and high tension magneto circuits.

These plugs were designed primarily to give reliable service under any and all motor running conditions.

Oil cannot short-circuit them.

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THE ONLY PLUG FOR MAGNETO

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The longer you use

BEILFUSS MOTORS

the better you'll like them.



Two Cylinder Opposed.

Air-cooled, 10 to 12 H. P.

Water-cooled, 10 to 12 H. P. and 18-20 H. P.

Their compactness and light weight make them particularly desirable for cars of the runabout class.

We can quote you interesting prices. Do you want full particulars?

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A Trouble-Saver

Dry battery troubles are many, and almost all due to NOT KNOWING how your battery stands. The Eclipse indicates in ANY position, and EITHER direction. \$3.

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THE INCREASE IN THE NUMBER OF Automobile Manufacturers that are using the

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on their 1909 Models is very noticeable. can only mean that they consider the HANCOCK far superior to others.—And it is.

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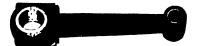
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CRUCIBLE STEEL CASTINGS

Smooth and True to Pattern

Tensile Strength 80.000 lbs.



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Consist of Safety Water Tube Boiler, Automatic Water Regulator, Blue Flame Kerosene Burner, Automatic Fuel Regulator, Burner Valves and Strainers

We also manufacture DOUBLE ACTING COMPOUND STEAM ENGINES, of from 15 to 30 Horse Power. FEED WATER HEATERS, AUTOMATIC AIR PUMPS.



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absolutely does away with all air pressure on the fuel In less
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secured. Price for size 18 x 4 in., \$30.00.

All our Speciaties are adapted to Whites, Stanleys,
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LOOK US OVER; THEN BUY. MIDDLEBY

Runabout, price, \$850.00 Surrey, price, \$1000.00 Touring Car, price, \$1250.00

Four cylinder, four cycle, 4" stroke and bore, air cooled, three speeds forward and one reverse, slide gear transmission, shaft drive, 108" wheel base, 32 x 3½ tires on Runabout and surrey, 33 x 4 tires on touring car, complete with two gas lamps, generator, two side oil lamps, one tail lamp, French horn, tabe and lools. Magneto free on Surrey and Touring Car.

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MIDDLEBY AUTO COMPANY,

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The "Exide" Sparking Battery

Has 20 Years' Experience behind it. ¶ The one battery backed up by 2 Laboratory Tests before you get it. No "Seconds." ¶ The Insurance don't cost much but it means Reliability. ¶ Dealers should get our proposition on renewals for Electric Vehicle Batteries. ¶ Over 90% of all Electric Autos made use "Exide" Batteries. The experience that has brought this about is safe for you to follow.

THE ELECTRIC STORAGE BATTERY CO. 1888 1909

NEW YORK

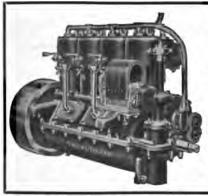
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ALL SHIPMENTS FROM THE NEAREST "Eride" DEPOT



RUTENBER MOTORS

BEST EVER MADE

Some of the most successful manufacturers of cars in this country trace their popularity to Rutenber Motors.

Made in the following sizes:

4 cylinder, 4 x 4, 25-28 H. P. 4 cylinder, 4 x 5, 30-35 H. P. 4 cylinder, 41 x 5, 40-45 H. P. 6 cylinder, 41 x 5, 50 H. P.

The Rutenber has no equal for power developed, smooth running and general efficiency.

Rutenber Carburetors will solve your carburetor troubles.

THE WESTERN MOTOR CO., Logansport, Ind.



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We are the only concern in the world who make completely filtered Pennsylvania oils of sufficient lash test and body to properly lubricate a gas engine. In proof of this statement we invite a comparison between Havoline Oil and any other brand of oils made. Write for our 1909 Illustrated Catalogue—it's free.

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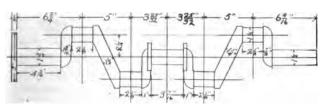
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DROP FORGED CRANK SHAFTS



We have about 200 special crank shafts that will finish like cut, on which we will make a very low price. If you can use any of them, write us for price, stating how many you can use.

WESTERN MALLEABLE STEEL CO.

Manufacturers of Drop Forgings, Malleable Steel Castings, Crucible Steel Castings
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Speaking of Bearings and Mileage. 'After 54,000 Miles

of hard service—the bearings in perfect condition. Read the unprejudiced testimony of the man who has no axe to grind—The Garage Man.

RAY S. DEERING AUTOMOBILES

THE TIMKEN ROLLER BEARING CO., Canton, O.

Chicago, Feb. 27, 1909.

Gentlemen:—I have just removed from a 1906 model Queen Touring Car, one of your rear axles which was damaged by collision with a street car. On account of the hard service that the axle has had to stand, I thought that it might be of interest to you to know the condition in which it was found.

This car weighs, with its equipment, 2984 pounds and was placed in service in March, 1906, just three years ago. It has been driven lifty-four thousand miles, over all kinds of city and country roads.

After tearing the axle down, all bearings, cones, etc., were found to be in perfect condition, the marks of the wheel used in grinding the rollers and cones are not worn off, nor was it possible to tighten up any of the adjustments. The differential and driving pinion, after being cleaned with gasoline, do not show even the slightest wear, and all gears mesh as nicely as if they were just out of the milling machine.

In all my experience as a repair man I have never found an axle on any car at any price that has

stood the test that this one has. To my positive knowledge it has not been touched except to renew the external brake band lining, and replenish the supply of grease in the case since it was put in service. The squared ends of the drive shafts fit the wheel hubs and differential perfectly.

When it is considered that this car has had the worst kind of abuse instead of intelligent care the condition of the axle becomes more remarkable, and goes to show that the design and material in this axle

are certainly correct.

Trusting that this is of interest to you, I am, Yours truly,

RAY S. DEERING.

It is needless to say both the axles and bearings were TIMKEN PRODUCT; no other bearing manufactured could stand up under the severe service—and that is why over 70% of all the high-grade automobiles and 90% of the trucks built in this coantry use them.

If you would like to have detailed facts and figures to fit your case, write us. THE TIMKEN ROLLER BEARING AXLE CO., :: CANTON. O. Branches:-10 E. 31st St., New York City 429 Wabash Ave., Chicago, Ill.



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AND

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Equal to the best French prod-Look for our tradeucts.

mark if you want to be sure of getting horns of quality and finest work-

We are the largest manufacturers of Horns in the United States; also flexible tubing, reeds and supplies. It will pay you to have our catalog and quotations on any quantity. Our prices are right and our horns give good service.

STANDARD METAL MFG. CO., Chestnut, Jefferson and Malvern Sts., Newark. N. J.





Whoever esteems a car's reliability and length of life as a vital factor in its actual value, will find the 1909 Marmon models intensely interesting. Manufactured entirely by us and unsparingly equipped.

The "Thirty-two," \$2400. The "Fifty" (7 Passengers), \$3750.

Nordyke & Marmon Co. (Estab.), Indianapolis, Ind.

Standard Migrs. A. M. C. M. A.

The Easiest Riding Car In The World



THE STAR

A speedometer with all the merits and none of the defects of its many competitors. As accurate as a watch, and as staunch as a steam engine. Nothing to get out of order, since there is only one spring in the entire instrument.

Investigate the "STAR" before purchasing a speedometer for your new car.

Price, \$25.00. Discount to the Trade

The Star Odometer

for Electrics and Runabouts has all the excellent features of the "Star Speedometer" with the exception of the speed gauge. The value of the "Star Odometer" can only be determined by test. It will save its cost many times over in a single season to the Electric Car Owner. Can be attached to floor or dash.

Price, \$15.00

Manufactured by THE STAR SPEEDOMETER CO., Danville, Pa.

GEO. W. NOCK CO., Philadelphia, Pa.

Distributers for Pennsylvania, New Jersey, Delaware, Maryland and Virginia

MANZEL

FORCE FEED OILERS



For lubricating the cylinders and bearings of all kinds of Gas and Gasoline Engines.

Feed always in sight. Each feed regulated independently. Basily regulated. Positive.

Any number of feeds. Rotary or Ratchet Drive.

WRITE FOR FULL PARTICULARS MANZEL BROTHERS CO.

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Who Foots Your



When the garage em-loyees use your car or run he engine without load ployees use your car or run
the engine without load
while standing on the washing platform, who pays
for the gasoline and the
lubricating oil consumed?
When they idly run the engine and clog the cylinders
and valves with carbon
deposits, who pays to have
the engine taken down and
the carbon cleaned out?
When some one gets away
with your car after you
have left it standing at the
curb, at whose expense is it
recovered and who pays for
the necessary repairing?

It is up to you!

The one way to stop all this is to equip your car with a BREAR CIRCUIT AUTO LOCK, which absolutely makes it impossible for anyone to use your car or even start the engine without the use of one of the Yale keys furnished you with the locking device. YOU ARE THEN MASTER OF YOUR OWN PROPERTY.

The price of this device will be saved in a month's time and YOU CAN PROVE IT BY COMPARING YOUR MINTENANCE BILLS. Communicate with nearest representative to you.

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SAFETY DEVICE COMPANY SOLE MANUFACTURERS INDIANAPOLIS. U. S. A.



Marble Methods

By the Marble Method retreading has been made a **Practical Proposition.** The bead and side walls of a tire are The bead and side walls of a tire are not overcured in an attempt to cure the raw stock on the tread. NOTE THAT THE WALLS OF THE TIRE PROJECT ABOVE THE MOULD, not coming in contact with the heated surface. If your experience with tire repairing has not been satisfactory, write us. Let us explain our method and the Marble Vulcanizing Plant

Vulcanizing Plant.

M. E. HAYWOOD MFG. CO. 332 N. Illinois St. INDIANAPOLIS INDIANA



IGNITION BATTERIES

GUARANTEED 1909 Leader 6-60

For \$7.50

Write for Fire-Fly Catalogue.

Best Made

Evansville. Ind. Hoosier Storage Battery Co.



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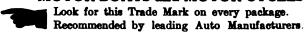
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Don't take every grease for

Y GREASE

THE PERFECT LUBRICANT For AUTOMOBILES.

MOTOR BOATS and MOTOR CYCLES



SOLD BY SUPPLY DEALERS

SAMPLES FREE

ADAM COOK'S SONS, 313 West St., New York

SHUR-HOLD BLOW-OUT PATCH

Goes INSIDE and Over BOTH Beads



Equal to an Extra Tire Requires No Cement

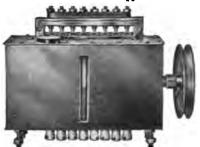
WILL NOT BULGE

If your dealer does not have them, write

INNER SHOE TIRE CO. Grand Rapids, Mich.

The "Sherwood" FORCE SIGHT FEED OIL PUMP

MODEL E Bottom or Side Supporte



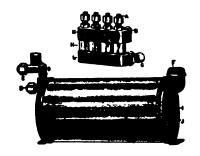
Pulley or Direct Shaft Drive

Gives Positive and Uniform Feed

RELIABLE and ECONOMICAL. Made of any capacity and number of feeds required. Manufactured by

SHERWOOD MANUFACTURING CO. Buffalo, New York

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Automatic

Lubrication is the only successful method of lubricating Automobiles. Always ready and never gets out of order. 75.000 in use.

> G. B. ESSEX BRASS CO. DETROIT. MICH.



Your dealer can afford to give you the BEST Headlight; insist on having it.

The ATLAS

with its superior ventilation and patent spring catch for the door, is the best Lamp made in the World. Take no other.

NEW YORK AUTO LAMP COMPANY

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ARE YOU LOOKING FOR A LARGE OUANTITY OF

Shaft-Drive Rear-Axles with Transmissions Combined?

Ours is for light cars up to 2100 pounds empty weight and 25-H. P. We have cut out all "frills" to make the combined axle and transmission in large quantities cheaply, but it is good, durable, and efficient in all its details. Ask us about it. WE ALSO MAKE THOUSANDS OF heavier axles (front and shaft-drive rears), Transmissions, Cone Clutches, Steering Columns, Steering Reaches, etc.

THE "LONG-ARM" SYSTEM CO.

CLEVELAND, OHIO

SEATS

We are making a full line of rumble seats and baby tonneaus for every model of Maxwell Runabout, Buick, Reo, Brush, Cadillac, Ford Runabout and other cars. Also make a complete outfit to convert any model of Ford Runabout into "S" or "T" Roadster. We make a complete line of fenders and running boards for any make of car. One Hundred second hand cars for sale. Send for catalogue.



1349 Michigan Ave.

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LAMP BRACKETS of CAST STEEL

CHEAPEST AND BEST

Furnished plain as per cut, or with stub threaded and fitted with nut and washer ready for attaching. Can also furnish special stub attachment to fit any car, or cast with special solid stub.

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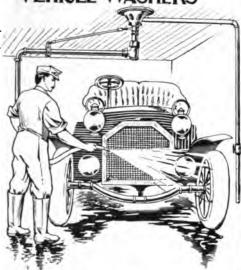
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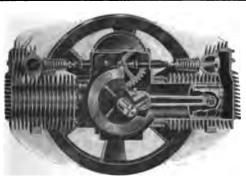
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TWO-CYLINDER MOTOR AS IT CAN BE BROUGHT TO A COMPLETE STOP AND THEN
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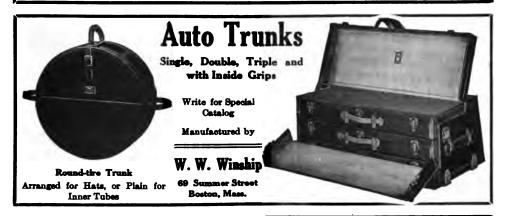
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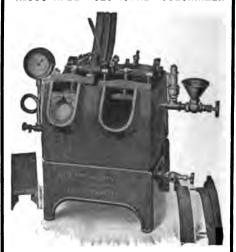
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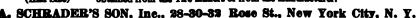
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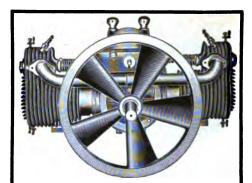
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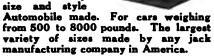
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Cannot gather dust.
Cuts rapidly and smoothly and leaves valve in perfect condition.
Used today by thousands with PERFECT SATISFACTION.

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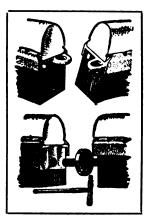
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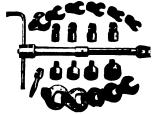
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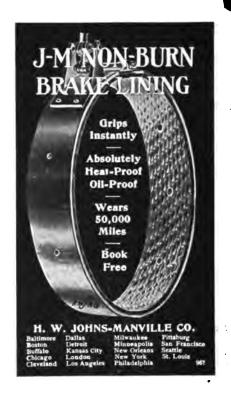
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Prompt Delivery
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Our special engine for this class of work will give to your commercial wagons a reliability to be obtained in no other way. BRENNAN STANDARDS have always been noted for power developed, quietness and smooth-running and this special motor embodies all the excellent points of its predecessors.

Made in the following sixes:

4-Cylinder, 1969, special vertical, 4x4, 4 9-16x4.

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Attach it to your old carburetor and it will give you the following great improvements:

It makes your old carburetor absolutely self-priming without waste of fuel or dripping of gasoline. It starts your cold motor even in freesing weather on the first complete cycle. I The simple closure (not opening) of the throttle on stopping your motor will make your engine almost sure of starting on the spark. It allows your motor to start with practically closed throttle, thus preventing any racing on starting. It acts as a complete and separate carburetor for slow speed and will run your engine slower than any other carburetor. It will make your engine pull better on hills and at slow speed. It will make your old carburetor 10 to 20% more economical. It will make your motor more flexible. It will indicate the level of the gasoline in the float chamber and also allows you to observe the thorough vaporization of the fuel when the engine is running.

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IN LARGE VARIETY Cover Rubber Goggles

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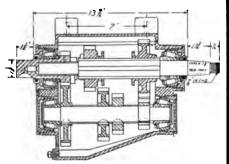
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Is possible only in a friction-drive car, with speed changes, in unlimited variety, instantly made without noise or fear of breakage. Great power saving.

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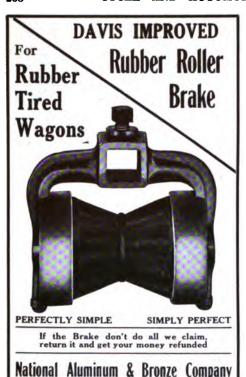
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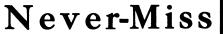
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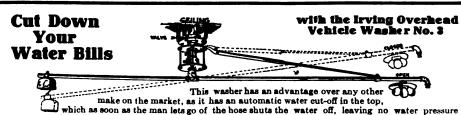
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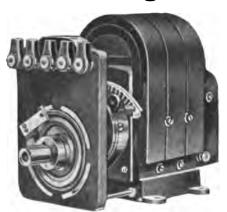
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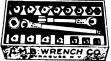
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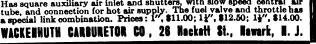


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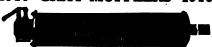
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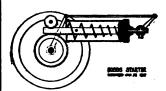
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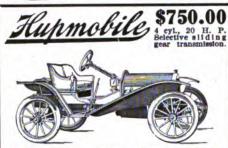
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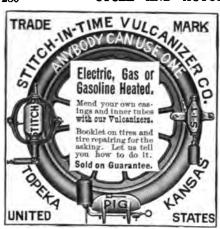
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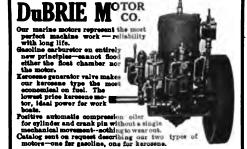
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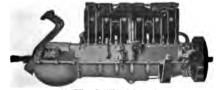
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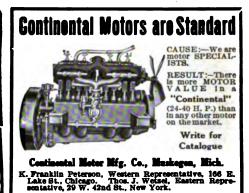


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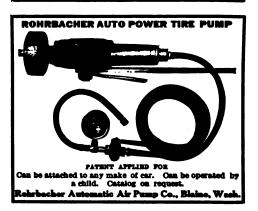
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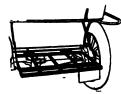
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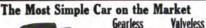
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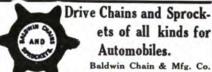
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PANHARD OIL

The Oil in the Checkerboard Can

THE LOGIC OF THE NEW CAN A GOOD CYLINDER OIL

Concerning the Conversion of an Automobilist from a "Cheap" to a Good Oil Wherein a Common Error is Exposed

A MAN NAMED SMITH bought an automobile. In a general way he had the right idea, that is, he didn't intend to let his car be the cause of unnecessary expense. He was going to economize.

JUST ABOUT THIS TIME a representative of the Knocko-Carbo Oil Company called. "What! You paying 60 cents a gallon for cylinder oil! That's ridiculous; now, I've got an oil," and here the salesman produced a sample, "that's 'just as good' as the oil you are now buying, and I will let you in on the ground floor, 20 cents a gallon—think of that!" THIS SOUNDED PLAUSIBLE ENOUGH and here was just the chance to economize.

THIS SOUNDED PLAUSIBLE ENOUGH and here was just the chance to economize. The oil was light in color, and hadn't he read in the automobile "trade papers" that a light oil meant freedom from carbon?—of course nothing was said about its lubricating properties. It was an oil—and to Smith all oils were pretty much alike.

THEN HIS TROUBLES BEGAN. The motor showed a tendency to "heat up." The cool-

THEN HIS TROUBLES BEGAN. The motor showed a tendency to "heat up." The cooling water, which never before reached boiling point, got hot enough to cook an egg. Of course, the oil wasn't suspected, so the car was sent to the repair shop to have the pump examined—result. six hours' labor to take the pump out. and a repair bill of \$4.00.

examined—result, six hours' labor to take the pump out, and a repair bill of \$4.00.

THERE WERE OTHER SYMPTOMS, TOO; for example, whereas formerly the engine would start without cranking, Smith found it almost impossible now to do it. Of course, he never thought of the oil, so he sent his car to the repair shop again, and lo! when the car came back there came with it a bill for regrinding the cylinders and fitting new pistons and rings—a little item of \$60.00.

ABOUT THIS TIME, when Smith was getting desperate, a friend with less economizing tendencies and more experience, suggested that poor lubrication might be the cause. Still 20 cents a gallon was a big saving. Perhaps it was not the oil, for the tendency to economize was still strong. Smith stood it manfully for a while, but the repairs came so thick and fast that something had to be done.

THEN HE TRIED THE OIL that "proves by Test, not by Color" that it is free from carbon. Also, it was an oil in which lubricating value was not sacrificed for lightness of color—wonderful what a difference this oil made. His engine resumed its old snap and power on hills, the pound disappeared and cooling troubles vanished.

IT WAS AN EXPENSIVE LESSON for Smith. He had saved perhaps \$5.00 at the most

IT WAS AN EXPENSIVE LESSON for Smith. He had saved perhaps \$5.00 at the most on his oil bill, but had paid out over \$64.00 for repairs, to say nothing of the time he was without use of his automobile. This was some time ago—now Smith cheerfully pays the price for good oil.

HERE'S THE POINT. We are up against this kind of competition all the time. We can't maintain the high quality of Panhard Oil and compete in price with cheap oils. We will positively not lower the quality to meet this competition. We believe that the great majority of automobilists appreciate our ambition to produce the highest grade of cylinder oil possible from the best crude stock. You can't get something for nothing and the oil business is no exception.

the oil business is no exception.

DON'T ECONOMIZE ON YOUR OIL, because it is no economy. The best is always the cheapest. Panhard Oil if used intelligently will not carbonize and it will lubricate.

WE WANT TO SEND YOU our new booklet, "LUBRICATION." The 1909 issue is off the

WE WANT TO SEND YOU our new booklet, "LUBRICATION." The 1909 issue is off the press. For over 30 years we have been supplying high grade oils in other lines of manufacture. Panhard Oil has been on the market since 1904. It has set a standard by which other cylinder oils are judged. Why not get the best?

GEORGE A. HAWS

110 Pine Street

New York City

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25 Companies Using Atlas Taxicabs

The absolutely essential requirements of a taxicab are the maximum amount of body room, with the minimum amount of mechanism with ample power and ease of control. Other requirements may be summed up in four words—Reliability, Low Maintenance, Durability.

Experience has shown that the complicated touring car chassis, with their complex four-cylinder engines and three-speed transmissions, did not fill these necessary requirements. A far simpler and more rugged construction was essential.

The Atlas two-cylinder, two-cycle engine successfully solves the problem for the power plant requirements, as the engine has but five moving parts, being practically indestructible. The power is ample, with a remarkable speed variation, safe and easy control of both engine and transmission.

The steering wheel and operating levers are mounted on the left side, which experience has shown to be a radical improvement for safe running.

The other parts of the Atlas Taxicab are especially designed for maximum strength and durability, completing a combination which has been taken advantage of by twenty-five taxicab companies now using the Atlas Taxicab.



Commercial Dept., 1924 Broadway, New York Fred. H. Adams, Manager

Seats five passengers inside—turns in 28 foot space, pressed steel frame, 102-inch wheel base, two speed sliding gear transmission, geared pump, geared fan, geared olier, Atwater-Kent ignition—8 oil lamps, and complete tool outfit with jack and tire repair kit.

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Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 239 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 273 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Pantasote Co. 285 Brown Co. 274 Motor & Mfg. Works Co. 172	Wheels (Auto) Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Wheel Fullers. Crane Puller 279 Empire Wheel Works 277
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 239 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 273 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Pantasote Co. 285 Brown Co. 274 Motor & Mfg. Works Co. 172	Wheels (Auto) Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Wheel Fullers. Crane Puller 279 Empire Wheel Works 277
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 239 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 273 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Pantasote Co. 285 Brown Co. 274 Motor & Mfg. Works Co. 172	Wheels (Auto) Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Wheel Fullers. Crane Puller 279 Empire Wheel Works 277
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 273 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Pantasote Co. 285 Trunks, Chauffeure'. Brown Co	Wheels (Auto) Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Wheel Fullers. Crane Puller 279 Empire Wheel Works 277
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 273 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Pantasote Co. 285 Trunks, Chauffeure'. Brown Co	Wheels (Auto) Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Wheel Fullers. Crane Puller 279 Empire Wheel Works 277
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co 265 Spacke, F. W. Mach. Co 255 Syracuse Gear Co 304 Van Dorn & Dutton Co 278 Warner Gear Co 235 Trimmings 285 Pantasote Co 285 Truoks, Chauffeure' 274 Motor & Mfg. Works Co 172 Trunk & Sample Case Co 295 Nathan Novelty Mfg. Co 241 Vehicle Apron & Hood Co 222 Winship, W. W 255 Trunk Racks. Pollard Auto Co 287	Wheels (Auto) Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Wheel Fullers. Crane Puller 279 Empire Wheel Works 277
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. 283 Pantasote Co. 285 Truoks, Chauffeure'. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. 255 Trunk Racks. Pollard Auto Co. 287 Tublag.	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 276 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 281 Burrowes, E. T. Co. 256 Crane Puller 279 Empire Wheel Works 377 Nightingale Whistles. Gleason-Peters Air Pump Co. 274 Nightingale Whistle Mig. Co. 255 Mandetson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Detroit Auto-Shield Co. 257 Earl Automatic Windshield Co. 203 Grossman, Emil Co. 303 Grossman, Emil Co. 303 Grossman, Emil Co. 303 Grossman, Emil Co. 304
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. 283 Pantasote Co. 285 Truoks, Chauffeure'. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. 255 Trunk Racks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149	Borbein Awheels (Aute) Empire Wheel Works 277 Hayes Wheel Co. 276 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 281 Burrowes, E. T. Co. 256 Crane Puller 279 Empire Wheel Works 377 Nightingale Whistles. Gleason-Peters Air Pump Co. 274 Nightingale Whistle Mig. Co. 255 Wied Sheiels. Anderson, F. W. Co. 146 Bail-Finize Co. 217 Burrowes, E. T. Co. 236 Detroit Auto-Shield Co. 237 Detroit Auto-Shield Co. 236 Grossman, Emil Co. 230 Grossman, Emil Co. 230 Mexger, C. A. 232 Kimball, C. P. & Co. 326 Mexger, C. A. 322 Kimball, C. P. & Co. 326 Mexger, C. A. 325 Kimball, C. P. & Co. 326 Mexger, C. A. 326 Mindel C. 232 Mindel C. 233
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 239 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 273 Warner Gear Co. 283 Pantasote Co. 171 Brown Co. 172 Motor & Mfg. Works Co. 173 Ajax Trunk & Sample Case Co. 295 Nathan Norelty Mfg. Co. 241 Vehicle Apron & Hood Co. 225 Winship, W. W. 255 Trunk Raeks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 264 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. 285 Trimmings. 285 Trunks, Chauffeure'. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. 255 Trunk Rasks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 252	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 264 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. 285 Trimmings. 285 Trunks, Chauffeure'. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. 255 Trunk Rasks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 252	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 264 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 239 Rockwood Mig. Co. 265 Spacke, F. W. Mach. Co. 25 Spacke, F. W. Mach. Co. 25 Spracuse Gear Co. 304 Van Dorn & Dutton Co. 273 Warner Gear Co. 283 Pantasote Co. 283 Rown Co. 173 Trueks, Chauffeure'. Brown Co. 173 Trueks Sample Case Co. 295 Nathan Novelty Mig. Co. 241 Vehicle Apron & Hood Co. 225 Winship, W. W. 255 Truek Raeks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Accessories Mig. Co. 270 Weber Cycle & Supply Co. 270 Weber Cycle & Supply Co. 270 Twe-Spaced Gears.	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 264 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. 285 Trimmings. 285 Trunks, Chauffeure'. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. 255 Trunk Rasks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 252	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 264 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Trusks, Chauffeure'. Brown Co. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. 255 Trunk Raeks. Pollard Auto Co. 287 Buffalo Tube Co. 283 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 252 Auto & Accessories Mfg. Co. 270 Weber Cycle & Supply Co. 279 Twe-Speed Gears. N. S. U. Motor Co. 200	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 263 Earl Automatic Windahled Co. 264 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257 Kimball, C. P. & Co. 257
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 259 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Trusks, Chauffeure'. Brown Co. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 22 Winship, W. W. 255 Trunk Raeks. Pollard Auto Co. 287 Buffalo Tube Co. 283 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 252 Auto & Accessories Mfg. Co. 270 Weber Cycle & Supply Co. 279 Twe-Speed Gears. N. S. U. Motor Co. 200	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Martin R. J. Mg. Co. 250 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257
Haif-Neison Tire Co	New York Gear Works 239 Rockwood Mfg. Co. 265 Spacke, F. W. Mach. Co. 25 Syracuse Gear Co. 304 Van Dorn & Dutton Co. 278 Warner Gear Co. 235 Trimmings. Cowles, C. & Co. 285 Trunks, Chauffeure'. Brown Co. 274 Motor & Mfg. Works Co. 173 Trunk & Sample Case Co. 295 Nathan Novelty Mfg. Co. 241 Vehicle Apron & Hood Co. 227 Winship, W. W. 255 Trunk Rasks. Pollard Auto Co. 287 Buffalo Tube Co. 287 Mackenzie-Walton Co. 149 National Tube Co. 252 Auto & Accessories Mfg. Co. 270 Weber Cycle & Supply Co. 279 Two-Speed Gears. N. S. U. Motor Co. 200 Usiversal Jeints. Auto Parts Mfg. Co. 265 Blood Bros. Macking Co. 266 Net Co. 200 Usiversal Jeints. Auto Parts Mfg. Co. 265 Blood Bros. Macking Co. 265 Double Co. 200 Usiversal Jeints. Auto Parts Mfg. Co. 265 Blood Bros. Macking Co. 266 Blood Bros. Macking Co. 266 Blood Bros. Macking Co. 226	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Martin R. J. Mg. Co. 250 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257
Haif-Neison Tire Co	New York Gear Works 239 Rockwood Mfg. Co 265 Spacke, F. W. Mach. Co 225 Syracuse Gear Co 304 Van Dorn & Dutton Co 273 Warner Gear Co 233 Trimmings 283 Pantasote Co 283 Pantasote Co 284 Frown Co 274 Motor & Mfg. Works Co 172 Truests. Ajax Trunk & Sample Case Co. 291 Nathan Novelty Mfg. Co 241 Vehicle Apron & Hood Co 225 Trunk Rasks. Pollard Auto Co 287 Tubing. Buffalo Tube Co 263 Mackenzie-Walton Co 149 National Tube Co 263 Mackenzie-Walton Co 263 Mackenzie-Walton Co 279 Turn Tables. Auto & Accessories Mfg. Co 279 Weber Cycle & Supply Co 279 Twe-Speed Gears. N. S. U. Motor Co 200 Usiversal Jeits. Auto Parts Mfg. Co 265 Blood Rros. Machine Co 286 Blood Rros. Machine Co 226 Boston Gear Works 292	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 251 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 251 Burrowes, E. T. Co. 258 Crane Puller 270 Empire Wheel Works 277 Nightingale Whistles, Glesson-Peters Air Pump Co. 274 Nightingale Whistle Mg. Co. 255 Marderson, F. W. Co. 146 Ball-Fintze Co. 217 Burrowes, E. T. Co. 256 Bardt-Johnson Co. 277 Burrowes, E. T. Co. 256 Earl Automatic Windahled Co. 263 Earl Martin R. J. Mg. Co. 250 Mezger, C. A. 252 Kimball, C. P. & Co. 252 Kimball, C. P. & Co. 257
Haif-Neison Tire Co	New York Gear Works 239 Rockwood Mfg. Co 265 Spacke, F. W. Mach. Co 225 Syracuse Gear Co 304 Van Dorn & Dutton Co 273 Warner Gear Co 233 Trimmings 283 Pantasote Co 283 Pantasote Co 284 Frown Co 274 Motor & Mfg. Works Co 172 Truests. Ajax Trunk & Sample Case Co. 291 Nathan Novelty Mfg. Co 241 Vehicle Apron & Hood Co 225 Trunk Rasks. Pollard Auto Co 287 Tubing. Buffalo Tube Co 263 Mackenzie-Walton Co 149 National Tube Co 263 Mackenzie-Walton Co 263 Mackenzie-Walton Co 279 Turn Tables. Auto & Accessories Mfg. Co 279 Weber Cycle & Supply Co 279 Twe-Speed Gears. N. S. U. Motor Co 200 Usiversal Jeits. Auto Parts Mfg. Co 265 Blood Rros. Machine Co 286 Blood Rros. Machine Co 226 Boston Gear Works 292	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 279 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 281 Burrowes, E. T. Co. 286 Crane Puller 279 Empire Wheel Works 377 Crane Puller 379 Empire Wheel Works 377 Nightingale Whistles. Gleason-Peters Air Pump Co. 274 Nightingale Whistles. Gleason-Peters Air Pump Co. 274 Nightingale Whistle Mig. Co. 255 Barl Autoes Steel Co. 186 Ball-Fintze Co. 186 Ball-Fintze Co. 217 Burrowes, E. T. Co. 286 Earl Automatic Windahield Co. 252 Earl Automatic Windahield Co. 252 Earl Automatic Windahield Co. 252 Kimball, C. P. & Co. 250 Mezger, C. A. 252 Kimball, C. P. & Co. 253 Limousine Carriage Mig. Co. 271 National Auto Top Co. 283 Ross & Browne 283 Smith, Jos. N. & Co. 291 Nathan Noveity Mig. Co. 241 National Auto Top Co. 283 Ross & Browne 283 Smith, Jos. N. & Co. 291 Naprague Umbrella Co. 262 Vanguard Co. 262 Weed Werting Masblestey.
Haif-Neison Tire Co	New York Gear Works 239 Rockwood Mig. Co. 265 Spacke, F. W. Mach. Co. 25 Spacke, F. W. Mach. Co. 25 Spacke, F. W. Mach. Co. 25 Spracuse Gear Co. 304 Van Dorn & Dutton Co. 275 Warner Gear Co. 285 Trimmings. Cowles, C. & Co. 283 Pantasote Co. 285 Trunks, Chauffeure'. Brown Co. 274 Motor & Mig. Works Co. 173 Ajax Trunk & Sample Case Co. 295 Nathan Norelty Mig. Co. 241 Vehicle Apron & Hood Co. 241 Vehicle Apron & Hood Co. 287 Tunk Rasks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 255 Turn Tables. Auto & Accessories Mig. Co. 270 Weber Cycle & Supply Co. 270 Blood Bros. Machine Co. 286 Blood Rros. Machine Co. 286 Boston Gear Works 292 Gerome, T. F. 290	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 277 Hayes Wheel Co. 281 Indestructible Steel Wheel Co. 286 Schwars Wheel Co. 281 Burrowes E. T. Co. 286 Crane Puller 277 Empire Wheel Works 277 Gleason-Peters Air Pump Co. 274 Nightingale Whistles. Gleason-Peters Air Pump Co. 274 Nightingale Whistle Mfg. Co. 255 Wied Shields. Anderson, F. W. Co. 146 Ball-Fintze Co. 127 Barndt-Johnson Co. 277 Burrowes, E. T. Co. 286 Detroit Auto-Shield Co. 285 Earl Automatic Windshield Co. 285 Earl Automatic Windshield Co. 286 Irvin, R. J. Mfg. Co. 280 Mezger, C. A. 282 Kimball, C. P. & Co. 383 Limousine Carriage Mfg. Co. 377 Mesger, C. A. 282 Kimball, Co. 283 Smith, Jos. N. & Co. 221 Vende Apron & Holed Co. 222 Venguard Co. 222 Venduard Co. 223 Venduard Co. 224 Venduard Co. 224 Venduard Co. 224 Venduard Co. 225
Tires (Emergency) Haif-Nelson Tire Co	New York Gear Works 239 Rockwood Mig. Co. 265 Spacke, F. W. Mach. Co. 25 Spacke, F. W. Mach. Co. 25 Spacke, F. W. Mach. Co. 25 Spracuse Gear Co. 304 Van Dorn & Dutton Co. 275 Warner Gear Co. 285 Trimmings. Cowles, C. & Co. 283 Pantasote Co. 285 Trunks, Chauffeure'. Brown Co. 274 Motor & Mig. Works Co. 173 Ajax Trunk & Sample Case Co. 295 Nathan Norelty Mig. Co. 241 Vehicle Apron & Hood Co. 241 Vehicle Apron & Hood Co. 287 Tunk Rasks. Pollard Auto Co. 287 Buffalo Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 263 Mackenzie-Walton Co. 149 National Tube Co. 255 Turn Tables. Auto & Accessories Mig. Co. 270 Weber Cycle & Supply Co. 270 Blood Bros. Machine Co. 286 Blood Rros. Machine Co. 286 Boston Gear Works 292 Gerome, T. F. 290	Borbein Auto Co. 261 Empire Wheel Works 277 Hayes Wheel Co. 276 Indestructible Steel Wheel Co. 186 Schwars Wheel Co. 281 Burrowes, E. T. Co. 256 Crane Puller 279 Empire Wheel Works 377 Nightingale Whistles. Gleason-Peters Air Pump Co. 274 Nightingale Whistles. Gleason-Peters Air Pump Co. 275 Nightingale Whistles. Gleason-Peters Air Pump Co. 276 Nightingale Wind Seleids. Anderson, F. W. Co. 144 Ball-Fintze Co. 217 Barrows, E. T. Co. 256 Detroit Auto-Shield Co. 252 Earl Automatic Windshield Co. 252 Limousine Carriage Mfg. Co. 373 National Auto Top Co. 253 Kimbail, C. P. & Co. 253 Nathan Noveity Mfg. Co. 341 National Auto Top Co. 253 Smith, Jos. N. & Co. 251 Sprague Umbrella Co. 253 Vanguard Co. 253 Vanguard Co. 253 Vanguard Co. 253 Vanguard Co. 253 Vehicle Apron & Hood Co. 253 Weed Werkling Massleery. Defiance Machine Works 254 Bestler, Baleice 254
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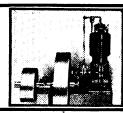
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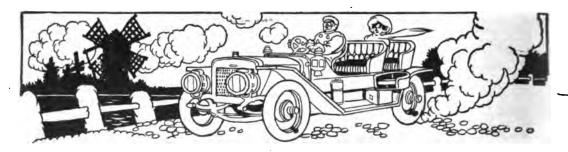
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